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Night Is in the Pinelands

By ARCHIBALD RUTLEDGE

Illustrated by Edmund J. Sawyer

THERE is in the blood of all of us a salutary strain of the primeval that responds to the wilder and more mysterious aspects of Nature; and in the presence of the barbaric yet tender beauty of the night, the deep, though often sleeping, affection that we have for Nature, and our sense of trust in her beneficent ways, return to us, taking us as social or financial aspirants, or as subtle disputants, and making us children once more, with the spontaneous and joyous capacity to wonder, and a serene hope that a Power infinitely greater and wiser than ourselves tenderly watches over us and is intent upon directing our destiny. Day, that divulges so much, has a tendency to conceal the spiritual, and to make intimacy with the eternal impossible. It is night that, for all its darkness and its moonlit shadows, really unveils the deeper beauty of the world, and makes us conscious of melodies inaudible by day, loveliness unseen in the light. And when night is viewed from a station in the wilderness, it has all its original power. The arrival of its unobstructed glory, perhaps, has much the same effect on us as had the coming of the First Night upon Adam and Eve.

Night above a city loses its impressiveness, being little more than a mild darkness, blurred by myriads of glaring lights, that hide the stars and the purple deeps. But night

in such a place as the Southern pinelands immediately creates a sense of its divine origin, enabling one to see creation and to vision all life under the aspect of eternity. The Bible declares that men love darkness better than light because their deeds are evil; but there are other reasons for loving darkness than that it makes sinning easy. It is my hope to tell you of some of the other and better things that night in the pinelands has afforded me.

Southward from my plantation home in Carolina, the great forests of yellow pine, that delight in the humidity and in the rich alluvial soil of the vast coastal plain, stretch more than three hundred miles to the Gulf; northward they extend well over the North Carolina line; westward they span the mouldering fastnesses of the Santee, Four Holes, and Hell Hole swamps that lie glimmering and silent in almost primordial solitude. It is about ten miles from my place to the coast; and if you traverse that stretch of country, it will be under the ancient pomp of yellow pines, the mournful yet beautiful pageantry of which will accompany you until you come within sight of the lordly Atlantic.

Now, it is a strange thing, but in the region described, the present and what might be termed the original are in almost ludicrous proximity; or, to put it differently, civilization has invaded but has not changed a wilderness.

Man has entered Nature's sanctuary; but his entry has been an incursion, not a conquest. On the fringes of Montgomery Branch, on the sweet bay and sparkleberry ridges of Turkey Roost, I have often watched

"OUT OF THE DEWY BRAKES,
MISTY AND GLIMMERING,
RISE WOODCOCK THAT
FLEET ON WHISTLING
WINGS TO COVERTS
MORE ALLURING"



wild deer and turkeys moving about with as much unconcern as hunted game ever attains. Yet a great concrete highway runs within a mile, and up and down it the immense traffic between the North and Florida incessantly streams. While trucks were backfiring, and the horns of many motors were blaring, I have heard wild turkeys calling together, and little fawns bleating elfinly to their mothers.

I have said that this inrush of civilization had put the present and the past in startling juxtaposition. Perhaps it would be fairer to say that the immediate and the ancient are brought together, without any great effect on the latter; for I hold to the belief that man, whatever his achievements, will never wholly conquer Nature; or perhaps may become too wise ever to attempt it. In that case, as in all cases involving human relationships, infinitely more is to be gained by coöperation than by conquest.

This region therefore has preserved its wildness to a degree so unexpected and remarkable that, if one strays off the highroad, marvelous things will he see and hear; and it will hearten him to realize that, within sight and hearing of man's engines, Nature pursues tranquilly her ordinary course, serene and beautiful and timeless, which, when observed with loving understanding, has the power to confer some of that beauty and some of that serenity on the receptive heart.

In the pinelands of home at night, one hears more than he sees, and senses more than he hears. While I have roamed those wild solitudes in the dark, or by moonlight, at all times of the year, my greatest enjoyment of them comes during the winter. Then all insect and reptilian life is dormant. Then the woods are comparatively open, and the stars glitter with a wintry yet tender brilliance, shedding on the dreaming world the quiet ecstasy of effulgent peace. Then, too, the hale odors of the forest take wing on the night-wind, bringing to one the spiceries of myrtle, bay, pine, dewy mosses, wet aromas from misty morasses and piny woods.

At sundown, when I walk out of the plantation gateway, I leave behind the fields fading in the afterglow, the far-glimmering reaches of the river-marsh, the shouts and singing of the negroes, the homely and subdued noises of a great farm getting ready to go to sleep. Before me glimmers the white sandy road, leading, despite all the cynical

views of the realists, into a true realm of romance; leading into the secrecy and hush and hidden bloom of the night; leading into the vast pineland country—pagan, aromatic, dim, mysterious, full of voices, full of starry silences—dewy and strange with the glamour that day could never confer. It is a place alive with meanings, hints, and whispers; with forms and shapes, tinged by starlight and by moonlight; asleep, yet living in beauty. To me, the day has always been beautiful prose, clean and clear and delightful; the night has been poetry, poignant and deep, full of those undertones that are attuned to reach the heart alone.

Into the winter twilight I walk, while the gorgeous pageantry of the west fades nobly, in its brightness and in its fading splendidly silhouetting the darkly momentous pines, standing like warders of the night. It is as if millions of warriors were drawn up at attention, after having been reviewed by their great commander, the setting sun.

My winter twilights are likely to be mild, and of a stillness so profound that frequently I have heard the cries of wildfowl on the delta more than a mile away, and the talk of plantation negroes at a full mile through those slumbering woods. The twilight of the day and the twilight of the night—that is, the daybreak—are times when there is likely to be the greatest activity among the dwellers in the wilderness. A little more than a mile from home, in the pearly light of the afterglow, I stop on the edge of the Summer Bay to take in the sights and sounds of that idyllic hour when night is beginning to fall over the lonely pinelands.

High over the pines pass great flocks of blackbirds; I mean companies of thousands, speeding toward the delta, where they will roost in the marshes. Winnowing the winy air, small flocks of wood-ducks pass, their strange shrill cries answered by the voices of their fellows in the lagoons and ponds of the wildwoods. Soon the air will be alive with their dusky fleeting forms, and vibrant with the music of their flute-like voices. Now, going in the

other direction, a great spearhead of mallards drives westward, seeking, I know, harborage for the night in one of the great river-swamps. With raucous grunts great blue herons drift over with ponderous grace. I hear two in the heavens answering each other a half-mile apart. Out of the dewy brakes, misty and glimmering, rise woodcock, that fleet on whistling wings to coverts more alluring.



"THE FOX SQUIRREL, HIS LISSOME FORM SILHOUETTED AGAINST THE VAST VOID OF THE SKY"

Often, even in midwinter, at this mystic hour the woodcock sings his love-song; indeed, I have heard a score singing all at one time. It is not the song that so fascinates as the performance that accompanies the singing; for here is a bird that, in the dim heavens high above the tallest trees, does wonders on his wings. So faint is the light that I can barely discern the performer as he stunts on his high trapeze. The flight is a mazy one; sometimes slow, sometimes dazzlingly swift; now up, now down; now along a straight aerial pathway. Delightedly he flies, ecstatically he sings, as if the coming of the night had suddenly liberated his soul. It is always a privilege to see an essentially wild creature off his guard; and in this case one is privileged to see and to hear a beautiful bird, commonly silent and wary, abandon himself to a festival of rejoicing, secure in the occult shielding of the dusky wings of night. Even after the bird cannot be seen, the course of his flight can be traced by the thin sweet music of his wings and by his fairy song, which has in it a faintness and an eeriness that we properly associate with things of a world more shadowy than ours. I do not know any better way to get into touch with fairyland than by listening to the love-flight of the woodcock, while the sky is still flushed, though the stars are waking.

While this song is continuing, other bird-voices I hear: the good-night calls of white-throated sparrows, brown thrashers, cardinals. Wintering in the extensive shrubberies of the plantation, these birds do a lot of reassuring and comrade-to-comrade calling at sunset, as if they felt a communal interest in the safety of their fellows. Some of the sparrows sleep in the gray streamers of Spanish moss; and I have heard them calling with sleepy cheerfulness from their gently swaying cradles. All through the dark the mild faces of the stars will look down; and the singers will sleep in the pendulous mosses, moved gently by the fragrant invisible hand of the night-wind.

One of the birds that takes me oftenest into the pine-lands in the evening is the wild turkey; for there is more fascination about watching this princely creature than is hardly to be had from observing any other bird. On my place wild turkeys are plentiful, and are becoming in-

creasingly so. It is not difficult for me to repair to the woods at sundown and be afforded a sight of these magnificent birds going to roost. Let us see just how it is done, and I believe you will agree with me that this is one of the things out of which to get a real thrill when night invades the pinelands.

Wild turkeys have a regular range; sometimes this is of great extent, but they usually make a daily round of it. If the observer knows the country and can plot this range, he is almost certain to see the great birds. My strategy is

to intercept them at a given place at a certain time of day. If I am where they are due at a specified time, they will hardly fail to be there, and on schedule. Like most living things, they hanker after the place where they were born; and unless greatly disturbed will commonly be found near the old hearthstone. I have known an unmolested flock to sleep night after night in the same trees, and sometimes on the same limbs.

As they go to roost in the twilight, and come to ground in the wan luminance of early daybreak, not many observers have studied closely their roosting habits. I wish I had even a devaluated dollar for every one I have seen go to roost. The whole performance has a good deal of wildwood magic about it, and is quite enough reward for a far ramble at dusk into the deep forest.

One evening near Fox Bay I was watching for deer to come stealing out of those shadowy thickets when suddenly, very near me and very



"THAT EERIE FORM, LOOKING ALMOST BLACK IN THE WHITE ROAD, IS A GRAY FOX"

loud, I heard a flock of wild turkeys calling. As I was hidden in tall broomsedge, and as the turkey does not apparently use his sense of smell for detecting his lurking enemies, these splendid creatures were completely off their guard. They were not calling strayed members of the flock. They were just having a twilight frolic before going to roost. They kept dashing at one another in mock anger, stridently calling all the while, almost playing leapfrog in their antics. Their notes were bold and clear; and some that they gave would defy imitation; indeed, had they given none but the queer tones, and had I not seen them, I should have been unable to identify the callers. For about five minutes they played on the brown pine-straw floor of the forest; then, as if at a signal, they

assumed a sudden stealth, and stole off in the glimmering shadows. I stole after them. In a few minutes I heard them flying up to roost; and, maneuvering nearer, I had the pleasure of watching sixteen take to the trees.

In flying up they make little noise until their great wings strike the limbs and branches of the trees in which they alight. That sound, once identified, can always be recognized again. Contrary to general opinion, turkeys rarely roost high; and they prefer evergreens to bare trees for obvious reasons. I have found them chiefly in the dense tops of young yellow pines, not over forty feet high; and I have, in the moonlight, walked under wild turkeys roosting not more than twenty feet from the ground. When a wild turkey decides to sleep in a bare tree, he usually makes some attempt to camouflage his presence by selecting one that has in it festoons of moss, bunches of mistletoe, or old squirrel nests. In the eerie visibility of oncoming night it is often difficult to distinguish a wild turkey even in a bare tree. I usually do so by looking for what does not naturally belong there. The two best features for identification are the long snakelike head and neck, moving against the pale darkening sky, and the excessively long tail, which is more conspicuous when the bird is roosted than at any other time.

When flushed from the roost at twilight or at night, turkeys invariably alight in other trees, usually bare, and usually absurdly nearby. When flushed at daybreak, they commonly alight on the ground. In a lifetime of observing them in their native haunts, I never knew one to alight on the ground at night. This behavior shows the great bird's abiding respect for foxes and wildcats. In a swamp at dusk I have made a wild turkey fly five or six times; always would he alight in a bare tree; and never did he go more than a hundred yards. But I have seen a wild gobbler, scared from a tall pine in the daytime, tower to such a height and take such a course as made me certain that he would not come to ground short of a full half-mile.

While not nocturnal in its habits, one of the dwellers of the pinelands that is most restlessly active at twilight is the fox squirrel, a most beautiful and graceful creature, three times the size of an ordinary gray squirrel. While the very last roses are fading from the giant oriel windows of the west, I see, moving against the sky, on one of the tinged spires of a water-oak, a fairy shape, shadowy in the shadowy air, moving with infinite liteness and grace

along the dark limbs and through the bright foliage. Only the swaying of a branch beneath his weight betrays his presence. From the water-oak he jumps to a dead tupelo; and this he climbs to the very top, where he perches high above the woods, his lissome form silhouetted against the vast void of the sky. His extraordinarily long tail is draped over his perch with unintended grace. Why he goes to that high station at such an hour I cannot tell. Is it not because he loves beauty, and gains from a sundown some of the same delight as is then ours? It is my persuasion that wild things love beauty. Our love of that kind be-

comes articulate in poetry, music, painting, and sculpture; theirs, though inarticulate, and possessed in a minor degree, is none the less genuine. There the fox squirrel sits, gazing out over the vast sea of pines. He has found nothing to eat; he has no tryst with another squirrel; he is just pausing to enjoy life. And my enjoyment in watching him is akin to his pleasure in surveying things from a little private throne in the wildwoods.

To one who has been out much at night in the wilderness, there are perceptible distinct degrees of darkness, and there are varying kinds of silence. During the twilight and the dusk there is much subdued activity of wild things preparatory to retiring. Then the woods are suffused with lilac, orchid, and rosy lights. The transition from day to night has the quiet majesty that we associate with the eternal cosmic processes. Day dies in beauty, and night awakes in loveliness. The effect of this immense serenity on the

human spirit cannot but be beneficent. At such a time I feel the touch only of the things great and immemorial; only the mightier movements of Nature; only the stars and the seasons; only winds and rivers and stately trees, only life and love and death. The pinelands at night reconcile me to all that has been or may be; there I become an intimate of eternity, a joyous living soul, a child of God once more. As the great forest composes itself to sleep, so the human spirit in that environment comes to a stillness of ecstasy, accepting life as a privilege to be in communion with beauty, and with ancient order, and with the eternal rhythm of creation.

About a half-hour after the last of the amethystine light has faded from the west, a profound silence settles over the woods. All diurnal things are at rest; and the nocturnal things have not yet freely begun their roaming of the dim country of the night. It is at this time that the air is most richly perfumed with the dewy fragrances



"A WILD TURKEY USUALLY MAKES SOME ATTEMPT TO CAMOUFLAGE HIS PRESENCE IN A TREE FESTOONED WITH MOSS"

arising from wet leaves, damp pine-needles, misty myrtles. Through the plumed and purple tops of the pines the starlight steals wildly yet softly. From broom-sedge and white sand and warbling water clean aromas exhale. It is the hour of Nature's brimming chalice.

After a while the woods begin to be full of subtle movements of the wild creatures; there are subdued crackings of dry branches and twigs; there are sinuous brushings aside of bay-bushes and gall-berry plants; there are wary footfalls, almost soundless, yet audible. The barred owls and the great horned owls hoot, scream, and weirdly intone their occult callings and challenges. I hear an old foraging raccoon grunting in the bosky green darkness of a watercourse. All about me there is the sense of a host of shadowy creatures, near yet invisible; intensely wild, yet close to me. I identify them by the little noises that betray their presence and their identity. In the brightening starlight I can barely discern a few of these. That eerie form, looking almost black in the white road, is a gray fox; that stolid lumbering shape that looks almost white against the dark pinestraw of the forest floor is a 'possum, a strange Dickens-like character in the community of wild Nature that just wheedles his way through life. Little elfin noises in the bushes and the grasses and among the fallen pine cones tell me that the wood-rats and wood-mice are frolicking and feeding. It is strange, but one of these humblest rodents makes almost as much sound in moving about at night as does a deer, the noblest game of that country. He is the very spirit of the night: secret, star-wild, vanishing. I know now that deer are abroad in the dusky woods within easy sight, if it were day; but they are invisible, and the few sounds they make seem but a part of the wide mysterious whispering of the forest. Yet now I know that I shall see some of them, for that conflagration in the east, where a thousand pines are beginning to burn, is the rising moon.

From my station, which has been by the darksome borders of a gum and tupelo swamp, I move up a little woodland hill, where the forest is open and parklike. On my way, wild things get my scent, and scuttle or dash softly or crash away, the manner of their flight being determined by their size and their temperaments. By the time I reach my new position, moonlight is flooding the woods, and that mystic radiance has both a revealing and a concealing power. Here I will sit until deer come by me in the moonshine, as I know they will; for over this little rise runs one of their favorite paths. While they wander and stray a good deal to feed, they have standard highways; and from plantation records, that go back as far as the year 1686, I have reason to know that the wild deer are now using the same pathways through the woods

of home as they did three centuries and a half ago; and likely for ages before the coming of the French Huguenots.

Often have I watched deer by moonlight; sometimes from the ground, sometimes from a platform in a tree. On this particular evening I was just sitting on an old pine stump. Moonrise in the pinelands is the witching hour, when every scar is magically healed; when every object, however obscure and mean its aspect by day, is wrought to virginal marble by an all-forgiving wand, is statued in lily-white stone. The beauty of the moonlight has always seemed to me not so much a thing in itself as its transforming and transfiguring power. In that it is like love.

I have a long wait; but who will not wait amid deepening peace and increasing loveliness? At last they come: two fairy shapes, silent, elusive, beautiful. The mild night air is drifting from them to me, so that they do not detect my presence. Here are two great silver stags, with silver horns, moving with unpostured grace through a silvery world. They pause, as if posing for an argent picture. Nearer they come; and I notice that at certain angles in the moonlight they are almost invisible; at others they are vividly visible. Past me they glide, like spirits of the wilderness, having all the meaning connoted by the night, by stillness, and by the unwearied charm of Nature. Into the silver silences they vanish.

In these pinelands there formerly were many homesteads, now not only deserted but so completely disappeared that their sites are marked by nothing but a few live-oaks that seem memorial. The mocking-bird is not usually a dweller in the woods; but often a pair will be found in one of these oaks, the trees and the singers continuing the tradition of former human habitation. As I leave my station to turn homeward, in the lonely moonlight, I hear a mocking-bird filling the tender silence with ecstatic song. On quivering wings he rises, singing in his flight, flying as if on the wings of song. It is to this melody that I walk back to the plantation road, reaching it as the real deep of night comes on. To me there is something strangely unexpected in hearing a mocking-bird choiring in the pinelands, something as disconcerting as a baby's sigh; as if I had not really understood all that was in a heart that I thought I knew.

Yes, romance is in the pinelands; often when dawn spreads over them the streamers of her wide effulgent banners; often when those solitudes are shaggy with twilight; but most, I think, when night there ascends her lonely fragrant throne. For then the soul, like some shy flower, opens wide under the light of stars. . . . Night in the pinelands has brought me great happiness; and happiness is power, though power is not happiness.

We are happy to announce that another article by Mr. Rutledge will appear in the March issue of *Nature Magazine*, combining, once more, his understanding knowledge of wild-life, his philosophy of the many values of our outdoors and his outstanding literary skill.

The Mystic Unicorn

By WILLY LEY

THE STORY of the Unicorn begins with a mistake in the translation of the Bible. In some passages of the Old Testament a beast is mentioned "that never will be the servant of man." The Hebrew word for this animal is *R'ém* and it means the now extinct wild ox. In the translation of the Septuagint, however, the Greek word, *Monokeros*, is used, apparently because the story of a one-horned animal that was said to have great strength and fierceness was already well known. The word, *Monokeros*, which means "one, or single horn," was translated into the word *Unicornis* in the Vulgate—*Unicornis* being the Latin equivalent for *Monokeros*. So the Unicorn found a place in the Bible.

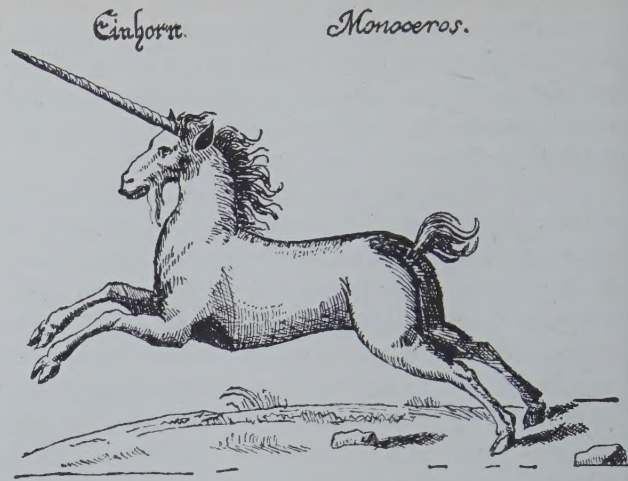
The Unicorn existed already in the Persian literature, antedating the Septuagint. It dated back to Ctesias, body physician of the Persian king, Artaxerxes II. Ctesias said in his description of India that there were wild asses, famous for their great running speed and similar in appearance to a horse. The colors were black, white and red and they had a single long and twisted horn in the middle of their foreheads. This horn, Ctesias emphasized, would be valuable as a drinking cup, for this material would inevitably prevent poisoning.

Such was Ctesias' story and all ancient authors copied it, each giving the Unicorn a few more features, such as the cloven hoofs of a goat, the hind legs of an antelope and the tail of a lion, or sometimes that of a pig!

Ælianus, a Roman author, stated that the Unicorn was sometimes also called *Carcazonon*, possibly a distorted form of the Arabic word, *Carcadan*, for rhinoceros. It must be remembered that the rhinoceros, although it does not look like it, is capable of swift motion and has all the strength the Unicorn was said to possess.

The horn of a Unicorn that was presented to Pope Gregory XIV in 1590 by the Prior and Brothers of the Monastery of St. Mary Guadalupe, Spain, was actually the horn of a rhinoceros. This was learned several centuries later, when in 1909 this famous horn was offered for sale. It has now its place in the American Museum of Natural History, New York, in the Hall of South Asiatic Mammals. The tip of the horn is missing. It had been ground to powder and administered to Pope Gregory during his last illness.

But the mixing up of the wild ox and the Uni-



THE UNICORN ACCORDING TO ONE ARTIST

The Greek word, *Monokeros*, means "one, or single horn" and crept into Biblical lore

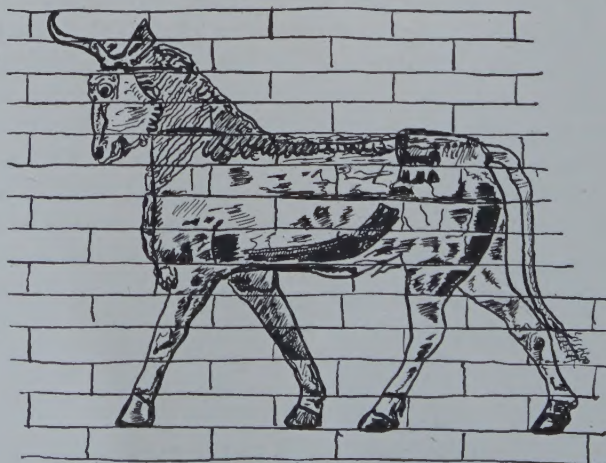
corn on one side, and the rhinoceros and the Unicorn on the other side, is not the whole story.

When, in the Sixteenth Century, the Swiss naturalist, Konrad Gesner von Zürich, who has been termed the German Pliny by the French and the father of modern zoology by the Germans, was busy with his collections of material about all known species of animals, he hesitated when he came to the Unicorn. Frankly, he did not believe the story. Being the city physician of Zürich, he was well acquainted with the use of Unicorn horns in prescriptions for wealthy patients. It was said to be the most potent medicine on earth. Certainly it was the most expensive! Gesner himself had prescribed it from time to time, but he confessed in his medical books that he never, when the patient insisted on the prescription of Unicorn horn, forgot to prescribe other medicines too!

He could not deny the fact that Unicorn horn existed in the pharmacy shops, and he was also quite sure that it was not rhinoceros horn.

In those times Unicorn horn was on sale in every large drug store and the pharmacists carefully distinguished between "unicornum verum" (true unicorn) and

"unicornum falsum." Unicornum falsum was the horn, or rather the tusk, of the male narwhal, sold at exorbitant prices by northern fishermen who kept its origin secret. Unicornum verum, to be genuine, must have had its origin in the earth. Some of them have been preserved in European museums, revealing that they are nothing else than tusks of ancient elephants, found frequently all over the European plains, part of the re-



POSSIBLY THE SOURCE OF THE UNICORN

A drawing, probably of a wild ox, showing one horn and perhaps giving birth to the Unicorn

mains of the ice-age, when many of these were engulfed.

After the period of great value (equal weight in pure gold!) the price dropped. This was probably due to the fact that too many horns of the verum type were discovered, and also that the patients could not help noticing that the treatment with the precious medicine failed to cure the diseases for which it was prescribed.

The question still remains, however, was there ever such an animal as the Unicorn. It is, of course, unlikely that the animal with the magical qualities actually existed, but it is also unlikely that the story was based only on the evidence of the horns.

There are three scientific theories as to the origin of the fable. The first believes that the Unicorn is nothing else than a misinterpreted and "idealized" rhinoceros. The second theory also credits a rhinoceros, but an extinct one. At the end of the ice-age, and probably many millenniums afterwards, a large animal, the *Elasmotherium*, lived in Siberia. The *Elasmotherium* was distantly

related to the rhinoceros, but seemingly was not so bulky and had its horn in the middle of its forehead instead of on the nose. Old folk-songs of the Tungus, a tribe of the Siberian steppes, still tell the stories of the battles their forefathers fought against the *Elasmotherium*. The legends say that this was the animal the Ice-Giant rode when he drove out Adam and Eve from Paradise.

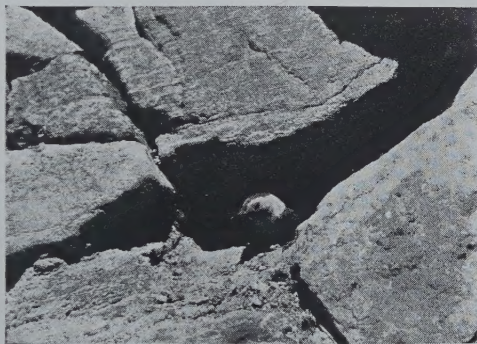
A third theory, and probably the one most near to the truth, was suggested by the German scientist, Professor Dr. E. Schrader. Schrader believes that Ctesias found in Persepolis pictures of the R'ém, the wild ox, showing the animal in profile so that it seemingly had only one horn. The Persians did not know the real wild ox. It was already extinct in their country, although it continued in northern Europe (for example in Poland) a few centuries later. So Ctesias already may have been supplied with a flock of fables when he first saw the picture of the animal and the fabulous Unicorn came into being through a series of misunderstandings.

Rocky Mountain Nuthatch

A LITTLE gay-gallant is the vivacious male nuthatch.

Canny, too, he is in deducing any snooping human while he is feeding his mate upon her nest. But I managed, once, to outwit a Rocky Mountain nuthatch that was bringing food to his female who was brooding seven eggs in a big hollow of a ponderosa pine. Cautious at first, just so soon as he realized that "the jig was up", he came and went with fair bravado, entering the nest-hollow sometimes above the core of the limb, and sometimes below it. This type of nesting place is quite unusual with the Rocky Mountain race.

Cruising, one May day, along interminable Wyoming shale hills, I caught a quick vision of a female nuthatch flitting along a slit between two shale slopes. Instantly she disappeared into a sloping bank. Carefully I lifted the loose pieces of shale, revealing a narrow hollow. A probing finger brought me a sharp peck for my impudence. But this daring creature kept plumping out from her nest-cranny after I had driven her in, defiant of my



TWO DIFFERENT NEST SITES

Homes of the Rocky Mountain nuthatch under shale and in a typical tree hole



By P. B. PEABODY

camerizing. Her nest was the usual loose aggregation of vegetable "loot", blended with fur of rabbit and mouse retrieved from excreta of coyotes.

There came a day of rare excitement. Upon the bed of a wild, narrow canyon, bristling with dead cedars and living pines, I followed the winding stream bed upward. With sharp suddenness a mourning dove flushed noisily, and disappeared up the canyon. Instantly the trained eye caught just a glimpse of a fugitive bit of gray, rising just beyond her and disappearing on the nearby slope.

A female nuthatch it was, with tail bent indicating nest-narrowness. Then, slowly and stiffly she hobbled along. Repeatedly she shook herself, proof that she had just left her nest. A second or two later her mate appeared, out of nowhere, with a bit of food in his beak. Instantly the female took it and disappeared under a slab of sandstone beneath a great pine. Beneath that slab, in a flimsy nest, were five pearly-white eggs, faintly specked with pale-brown.

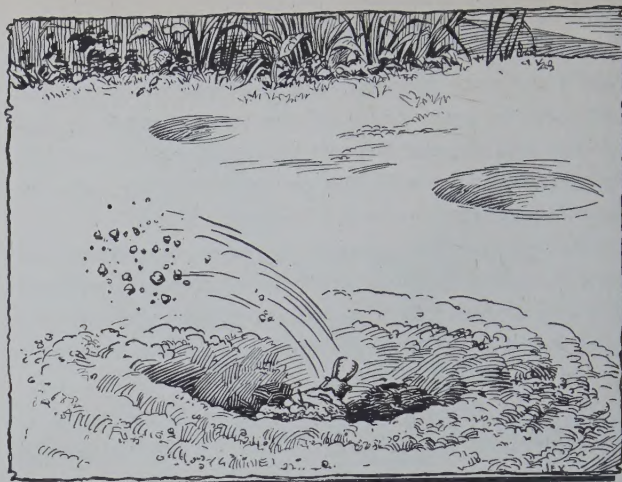
So I counted the day well-spent.

INSECT OF PREY

*The story of the wily ant-lion,
master strategist*

By HIRAM JEFFERSON HERBERT

Illustrated by Jex



FROM the histories of bygone heroes we gather strange facts. Progressive people of ancient days have contributed curious and interesting stories that tell of shrewdness and strategy. With much zest we read of the slight Napoleon, the amazing fire of the youthful, ambitious Alexander. The exploits of Tamerlane the Tartar are sources of rare wonder. At these things we marvel, yet in the world of insects we find histories and strategies that greatly surpass the accomplishments of man.

One of the most interesting of these creatures is this Insect of Prey. It makes a cunning practice of the nicest piece of strategy imaginable. It is a carnivorous insect.

By carnivorous I do not mean to imply that this interesting little insect stalks about in search of dead meat upon which it may feed. Neither does it await being fed by the hand of some keeper or slave that it has conscripted. Quite the contrary, this amusing little rascal falls entirely upon its own effective resources and depends upon no one. It is gifted with remarkable powers of subsistence and is endowed with a great deal of common sense.

This little fellow is named the ant-lion, not because it looks like either the ant or the lion, but because of its curious tactics. There is, however, some excuse for the fearful name from the mythological creature of antiquity which was reputed to be half lion, half ant, dashing about through the forests to frighten our foresires nigh to death.

Its life cycle consists of three definite stages well familiar to us: the egg, the larva, the adult, of which the larva is the most interesting. This is of particular engagement because of the fact that the larva seems to

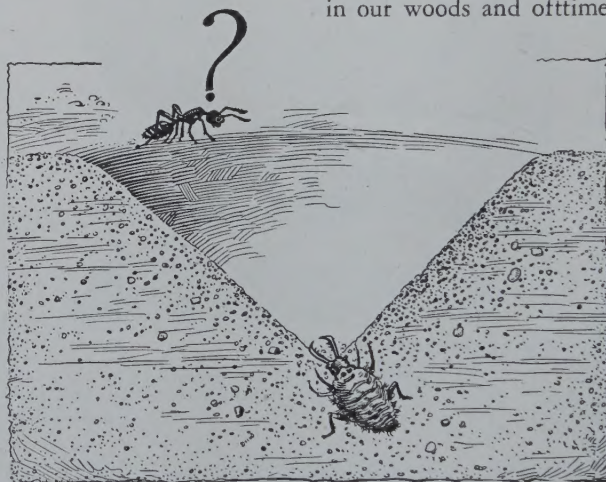
bear the ear-marks of a perfectly developed, well rounded insect. Its behavior and its astounding adaptation to its manner of living make it an exceptional study in insect life. So we will pass over the fact that an egg deposited in the dirt, which hatches into a "bug," which in turn and time weaves a perfectly round cocoon hidden in the soil, finally emerges as a fly similar to some of the smaller dragon-flies. Having done this, we will get along to one of the most interesting creatures found in our woods and oftentimes in our gardens. In my path

leading to the spring they are constantly active between the stones.

To begin with, our ant-lion seems to possess uncanny knowledge of the characteristic curiosity of ants. He gives astounding evidence of knowing that every self-respecting ant while cruising about amongst the leaves and poking her "brainy" antennæ under twigs and around stones is doing so because of her inborn efficiency. She is a very

thorough and painstaking insect, more so than any other, leaving nothing within her province unexplored and taking absolutely nothing for granted. She must obtain first-hand information which she will hand over to her superiors upon returning to the formicary (ant nest) after the day's journey.

The ant-lion knows that mademoiselle ant will not overlook approaching the brink of every nook and cranny . . . and *pit!* Always, upon perceiving a hole in the ground, she will hasten to its edge and peer carefully into its depths. If this happens not to satisfy her insatiable curiosity, further exploration is required. She will then proceed to descend the side of the pit, and that incautious step is very, very much to the ant-lion's liking—and rather necessary to his code of living in the manner



to which he (and his wife) has always been accustomed!

So the ant's unwise curiosity causes the cunning little ant-lion to smack his crusty lips in ecstasy, and the evening roll-call at the formicary reveals "one missing." Meanwhile, the ant-lion chuckles to his wicked self and watches the brink of the pit for another unsuspecting explorer. Invariably his wishes are granted.

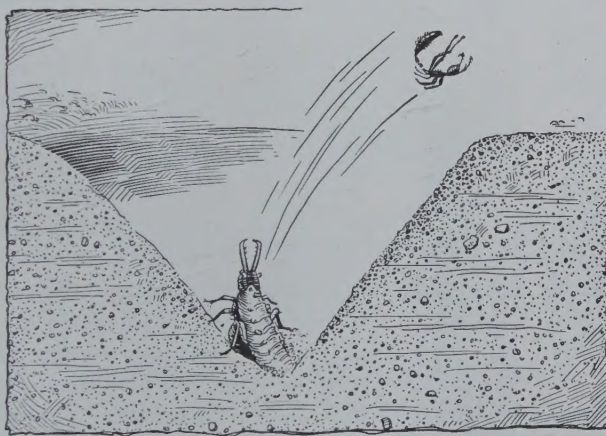
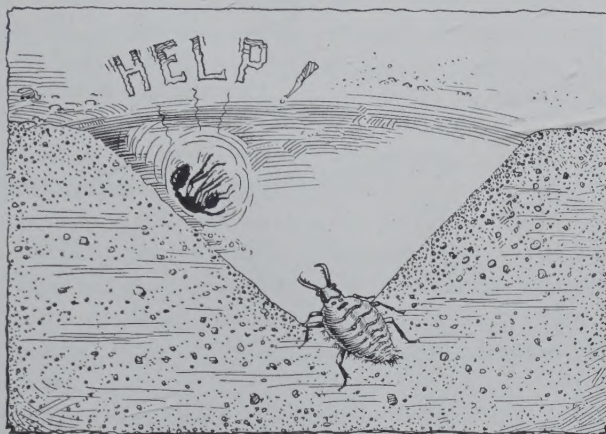
The body of the ant-lion is dusty gray, convex and somewhat elongated. The back is corrugated, suggestive of gray corduroy. In fact, although I dislike to resort to the term in relation to my shrewd little comrade, his shape is somewhat louse-like. He is capable of movements of an undulating manner and, like the crawfish, can move backward. It might be said that his movements are "hunching," and always he travels just under the surface, seldom above, leaving behind a miniature furrow. A good illustration of his method of moving about may be had by burying your hand in sand or loose earth and then moving it forward as a "measuring worm" would move its body. However, the undulations of the ant-lion are very rapid, with a projecting "leg" from either side by which he steers himself to the left or to the right.

His head protrudes from the body, is quite flat, and possesses two long and powerful projecting jaws, which can be moved about in any direction and motion that might suit his fancy or needs. These jaws are highly specialized. In fact, the head and neck seem to boast a "universal joint" attachment to the body. He can jerk this head and neck in any direction almost quicker than the eye can detect. Sometimes he will play "possum" when taken from his earthy home. If placed on his back he will snap-over to his stomach with a speed that would make skilled acrobats stand up to take notice. All of his movements excite admiration, more so than any insect I know, excepting the ant.

Now we have a picture of the ant-lion and an insight into his unaccountable knowledge of things. With this in mind we will go out in the woods to a spot of loamy earth and seek a half-day's entertainment. (You can also do this in your garden.)

We look about the spot of loamy earth and presently

discover several perfect funnel-shaped pits ranging anywhere from an inch to three inches in diameter at the brink, and from an inch to two inches in depth. The size of the pits depends upon the age and size of the maker. They are harmless looking arrangements, but curious, and as perfectly shaped as if fashioned by a craftsman with delicate instruments and measurements. The sides of the pit are finely pulverized and smooth, so that when we experimentally place a tiny gravel at the brink the surface of the pit gives way and slides so that the gravel tumbles neatly to the bottom.



We have brought along a teaspoon, and with this we scoop down under the bottom of the pit to dislodge the hiding ant-lion. After satisfying ourselves with his appearance in the morning sunlight we place him on the soft, loose dirt. Then we drop to our knees and prepare for the drama about to be enacted.

For several minutes he remains there, motionless. Then he will wiggle his back in his funny way, and remain quiet again. He is being cautious and wary. He knows that his protective coloring is self-sufficient, but just the same he would taste mighty good to a passing bird—so he practices vigilance.

Upon finding that nothing is happening to antagonize him further, he wiggles again, this time directing the tail of his "streamlined" body to enter the dirt . . . and then, almost before you are aware of

the movement, he is completely under the surface.

Now he begins to travel at random, first in one direction and then in another. This he is doing for two major reasons: he is trying to throw any pursuer off the trail, and at the same time seeking a likely place for the digging of his pit. And since he is very much angered because of the destruction of his former home he will tackle his new job with increased vigor. All that we can see now is the "hump" of earth mysteriously moving about, and the quiet furrow left behind.

Ah! He has settled down to business. He is moving in circles—but not without purpose—further loosening dirt and burrowing deeper and deeper in concentric circles, each one becoming smaller. His actions are somewhat spasmodic and you are highly amused. This play-

let set in the outdoor theatre of the woods surpasses the tension of a high-brow dramatization of human lives on a carefully set stage.

Your interest is now entirely focused upon this activity and presently you note that activity has ceased. But this is only momentary, for the ant-lion is always either active or vigilant. He has returned to the outer circle from which he began and is retracing his "steps." Watch closely! . . . How in the name of goodness can he possibly produce his perfect pit from this confusion of plowed earth?

There! . . . Like a Lilliputian blast a sprinkling of dirt is thrown into the air! An almost microscopic cloud of dust follows. As in a large-scale excavation reduced to minute proportions, construction is going on with a vigorous madness. Then another and another and still another blast in rapid succession. *Now look . . .* you can see his head and neck.

He begins to retrace his backward steps about the circular paths he has loosened, and as he travels he "humps" and "hunches" his body so that the dirt rolls down on his little flat head. He pauses, calculates and snaps his neck, and the sudden flick of his head tosses the earth away. He is traveling counter-clockwise, with much energy and determination. He is not to be outdone by our destruction of his former residence. He is not the kind to give up! Around and around he goes, tossing the earth from the top of his head until he has formed a rather crude pit.

Now he halts for several moments to examine his work. He meditates, contemplates and gets down to business again. This time for the finishing. Always, he is the finished craftsman. He takes a great deal of pride in his work—and *that* is the principal reason for his life being a huge success!

He burrows into the bottom of the pit and you wonder what is happening to him—when he works his head and long jaws out into view. These jaws he sweeps around the sides of the pit in perfect circles up as high as he can reach, from an eighth to a quarter of an inch. This movement causes a tiny avalanche. The earth falls upon his head! He plunges his jaws and head into this heap of fallen dirt and with a flip and flick of his hinged neck tosses it out! It is like watching a conscientious workman with a shovel hurrying to complete his work before the day is done. Thus, by a process of continuous undermining, the sides of the pit become perfectly smooth and finely pulverized. The constant tumbling of dirt has made them so!

Now he has finished, and withdraws proudly under the bottom of the inverted earth cone of the pit with only his alert jaws protruding. Unless you knew they were

there, you would not see them, for they are so much of the color of the pit. Thus he sits and waits, never moving, apparently never breathing. His handiwork is perfect, it is intriguing, it incites the curiosity of even humans.

We continue to watch, awaiting the "aftermath." The ant-lion has worked so hard and so earnestly that we secretly wish him some reward for his labors. We have wilfully destroyed his home and he has shown no discouragement whatsoever. He has immediately gone about the productive and progressive business of re-establishing his headquarters as a stubborn, invincible general might practice under the same circumstances in support of his beloved fatherland. This insect has taught us an object lesson in progress and optimism!

Presently we discern an ant coming along through the garden, investigating everything with which she comes in contact. She nears the pit, and a spirit of tense expectancy, of finality, hangs about the place. *Something is about to happen!*

She moves first this way and then that way. She pauses and seems to be either listening for something or to be watching something off in the distance of her vision. She scurries up near the brink of the pit while we watch with abated breathing, wondering just what the ant-lion is thinking about. Then the ant scampers off in some other direction to something more attractive to her, and we think that she is a very smart ant to have sensed this hidden danger and avoided it.

But very soon she returns to the brink of the pit, and we make ready to witness the climax of this curious drama. She has approached the pit and has stuck her inquisitive head over. Did curiosity get the better of her, causing her to re-explore? Now she is making a thorough examination. Her antennae are twisting in every conceivable direction. She is wondering why this thing is here, who made it, what it is, and should she investigate further. She decides that for the benefit of the formicary she should pry about. . . .

Camera! . . . Forward she steps. The earth gives way! Frantically she attempts to regain her footing and retreat. Now we are actually sorry for her helplessness . . . but—too late!

The action is spectacular. Like a man caught off his guard on a precipitous and treacherous mountainside, the ant tumbles down the well-laid slope. She hits the bottom with a muffled thud, realizes the trap, fights furiously to regain her footing on the crumbling walls, but in vain . . . she is much, much too late. The jaws of the ant-lion have snapped, and she is closed fast between them; jaws that never loose their grip.

She still struggles with all her power and cleverness, but the embrace of the ant-lion is too great and too tenacious to be broken. His movements are fatal and his judgment final. Escape is always impossible.

He drags the captive ant back out of sight under the dirt, and here he sucks the juices from her body. Such

Jane G. Ant---
MISSING!



is his food. Later, when all of the sweet juices have been drained from the body, he will drag the remaining shell for which he now has no use to the pit. Then he will brace himself, slide his head under the carcass and toss it clear of the pit as he would a grain of sand.

Now he peers around with a great deal of satisfaction as if to say, "Well, that's that! How did you like the show?" He sighs, tosses out the accumulated grains of dirt, puts everything in Bristol shape and retires within his sanctum to await the passing of the next ant or other insect.

If by any chance an insect apparently too large and formidable for him to handle drops into the pit he will very rapidly blast dirt and dust upon it. He does this to confuse the insect! *Then*, while the larger insect

is befuddled, the ant-lion grabs it—and the game is up.

This stage of the ant-lion's life runs through a period of two years. Then he will spin a spherical cocoon about half an inch in diameter, buried in the earth just below the surface. Always, these cocoons are protectively colored. A little later the occupants emerge, to fly away like finished warriors retiring to rest upon their laurels. In the summer sun they fly about like dragon-flies; and somehow this very unexpected and almost unbelievable change into a winged creature is the most peculiar of all its characteristics. But . . . mankind has never been quite able to understand the behavior of the insects. Although many have searched the subject, and have written books around their studies, it is a field of research scarcely developed, and the possibilities of new discoveries are vast.

An Unusual Cardinal Home

By ELEANOR COPELAND

MOTHER, who is lame, has to spend much time in her own sunny room upstairs. She has always loved birds, and, years ago in her own home, had feeding boxes around for them. A year ago last winter my husband fixed a small box on a wire and hung it from the eaves just in front of a window in Mother's room so that she could still have the pleasure and interest of feeding her birds. The box has to be pulled in to the window to put in the feed of sun-flower seeds, mixed scratch feed and such.

Along with the other winter birds came a pair of cardinals and stuffed themselves on sun-flower seeds. It was always a thrill to see them perched on the side of the box, lovely red against the winter sky and snow. They seemed so fully to complete the picture.

In March we stopped feeding the birds and cleaned out the boxes. What was our surprise one morning to find many little twigs in the small box hanging in front of Mother's window and to discover that the red-birds were building their nest there. They had built in bushes in our yard many times, but we had never heard of their building in a box before. I put some string and paper in the box among the twigs. In a few days we saw the nest forming, and, woven into it, were the string and paper! In a few more days we discovered the first egg and one more each day for four days. Finally the female began her task of hatching her family.

I had always supposed the female sat on the nest all the time until the eggs were hatched, her mate bringing her food. I learned differently. This red-bird was either restless or a modern mother—she could not be bothered to stay at home all the time!

One by one the eggs disappeared. It was mystifying



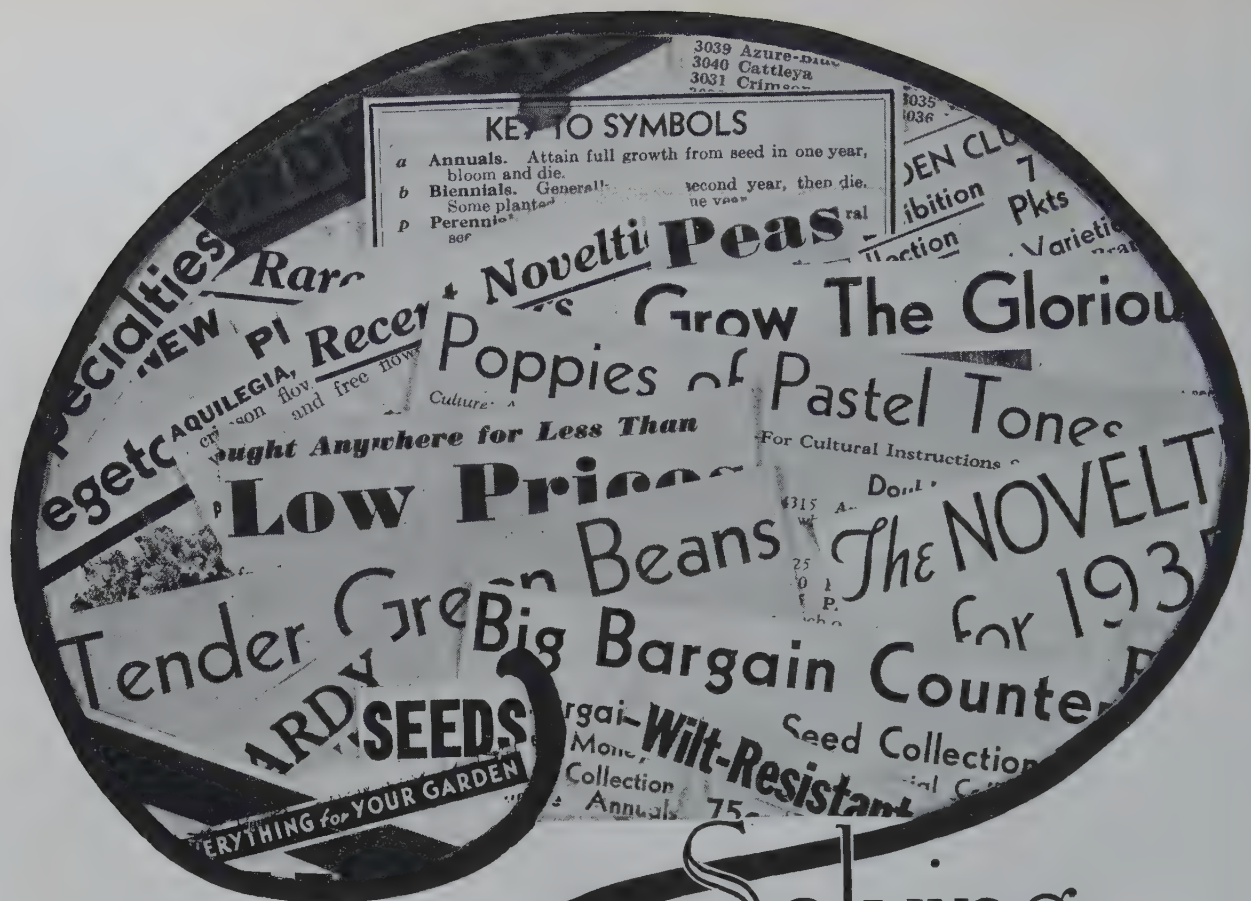
because they seemed to vanish into air. We never saw any other birds around, and, of course, no cat could get at the box. But one egg remained and the baby bird hatched. This youngster was our first concern every morning, and the day it left the nest we could do nothing but watch the venture.

My friends still laugh at me because I was so concerned as to how the baby was going to get out of the nest that I put pillows all around under the box so the baby could land on one if it fell! Of course it didn't fall; it glided down to the gutter of the upper porch, and, after getting over that thrill and getting its breath, sailed down to the ground in perfect safety! That was the twenty-second day of May, and the

baby stayed around our yard for several days. Happily no cat found it in the night, and I don't think the parents of that baby were any more concerned about it than we were!

In due time the baby grew up and departed for haunts of its own, but the father and mother returned to raise a second family in the same nest. Again it was just one baby that left the nest the Fourth of July.

But my story is not ended. All last winter we fed the birds, and again in March cleaned out the boxes. Imagine our joy when our red-birds came back to their nesting box. String and paper were provided and were woven into the nest. As the spring merged into summer three broods were raised: the first, only one baby; the second hatched three eggs but one baby was apparently deliberately left to starve; the third brood numbered three and all were raised to leave the nest in safety. We are hoping that this winter will find them at the feed box, and next March will see them again building their nest.



by
ADOLPH KRUHM

Solving SEED CATALOGUE PUZZLES

"I WANT—I want—I don't know what I want!" Such indecision is usually created by the arrival of the season's new crop of seed catalogs. After a while some lists are made of things that should help materialize your garden dreams. Then more catalogs arrive—you really don't recall for how many you wrote—and here is where the trouble begins. Then and there you must really analyze your garden wants and desires. And the newcomer should especially set up a definite goal at this stage of the garden game, because even the old-timer finds it a game and a gamble.

What *do* you want? I have known people who would see an attractive flower garden and immediately want to grow everything that is in it. Others get to be equally enthusiastic about a good-looking patch of vegetables.

Both are right because the gardener should grow whatever appeals most to him. So, while February winds are blowing and snow is drifting, a stack of garden catalogs is pleasant company before the fireplace.

After looking over a few, their contents will become a sort of garden path down which you would like to walk. As you wander thus you will find that you prefer to follow one walk more often than another. Your first step in analysing your garden of wants has been taken. But take this first step with caution; look over additional catalogs; do not confine your studies to pictures only but read the descriptions. If, after doing this, you

still find yourself walking along the same paths, go as far as you like—on paper.

No thoroughly satisfying garden was ever made the first year. Garden fashions change, as do desires. All the more reasons for putting down in black and white some facts about the start and, later on, the initial results. It is on the basis of such records that better gardens are developed; making the same mistake twice prevented. A

thorough study of catalogs proves a splendid investment. The majority of them are good and honest guides. They also hold a vast amount of useful information.

In wading through catalogs preparatory to making out orders the reader will soon notice a certain similarity in the arrangement of all of them. The student will generally find their opening chapters devoted to "specialties". These are varieties of seeds, bulbs or plants alluring to the seasoned gardener. They are trade builders of the future. If a seedsman discovers something really new and truly worthwhile he is quick enough to arrange for the exclusive sale of this item with either special contract growers or originators. The myth that every seedsman grows all the seeds he offers has been "exploded" long ago. Novelties mark progress. All the old standbys of today were someone's novelties years ago.

The adventures of a novelty hunter, however, are too dangerous for the beginner, whose first garden thirst should be quenched by standard varieties of proved merit. This is not intended to discourage experiments with new kinds, but the beginner will want to side-step possible disappointments lurking in the wake of high-priced new varieties, disappointments apt to turn a garden enthusiast into a pessimist.

The so-called novelty pages frequently describe both flowers and vegetables. They are followed by pages devoted to the old standbys, or "standards". The latter present, in various classes, a far greater number of varieties from which to make your selection. Their cost will, as a rule, be less than the new introductions.

It pays to take particular notice of the culture directions. Some catalogs give more space to these than others. Of late even plans and designs for making various kinds of gardens have appeared in catalogs. Many firms offer cultural leaflets with orders, and most seed packets are printed with some growing directions. A careful reading of these garden helps often stands for the difference between partial failure and success.

While most seed catalogs give the introductory pages to novelties, some firms think just as much of their extra selected strains of standards that have proved their worth. The difference in price between a given quantity of seeds of a commonly-offered variety, and a special selected strain of the same kind is generally small. Seasoned gardeners know that it pays to show preference for special strains.

Now we come to a rather delicate subject—the conventional offer of "readymade" collections. These will be found in increasing numbers for both flowers and vegetables. Intended primarily to make ordering easy, they offer both advantages and shortcomings. Their short-



WHEN SELECTING SEEDS ONE MUST VISUALIZE THE GARDEN

The gardener studying his seed catalogs while winter reigns outside must build a mind picture of the garden and its arrangement and choose his seeds accordingly

comings consist mostly in including items for which the gardener has no use; or they do not provide sufficient quantities of seeds for the planter's requirements. Collection offers seldom include "special strains", except now and then among flower seeds.

Another item of interest is the so-called "bargain offer". Obviously, with space at a premium in most seed catalogs, the dealer would hardly offer anything at a loss. Making up bargain collections in advance of the rush season stands for some savings to the seller. Handed on to the buyer, this saving may, in the final analysis, stand for a waste of valuable garden space or the gardener's precious time. It therefore pays to weigh bargain offers carefully. Better by far to give some serious thought to what the garden really should produce to serve actual needs.

First of all decide which vegetables and flowers you want to grow. Here is one way to solve this problem: Put down the *classes* or kinds of flowers and vegetables wanted. Asters will probably head the list of flowers (or will it be zinnias?), while beans may lead among vegetables. Then select from among scores of *varieties* or *sorts* in these classes those that you feel will best serve your tastes or pleasures. Sunshine asters prove very popular;

stringless, green-podded beans are favorites with all. Finally, consider the advisability of experimenting with some *unusual* new or old varieties and types.

How to decide on the classes depends primarily on available garden space. It is truly amazing how many plants will thrive even within limited space, if a workable plan is followed. It is quite the fashion to combine utility with beauty in the home garden. In our own flower garden such culinary herbs as parsley, chives and thyme are doing double duty as borders, while alyssum, nasturtiums, portulaca and other dwarf-growing flowers form a most attractive edging in the vegetable patch.

Where the total garden area covers less than one hundred by one hundred feet the planting of tall, spreading flowers or vegetables is impractical. Of course right here personal preferences govern the situation. I have seen entire gardens devoted to sweet corn and tomatoes. Again I have known cases where the gardener proved particularly fond of such bushy flowers as tall marigolds, mammoth zinnias, and cosmos, and devoted the entire garden to these. A happy middle course may be pursued.

Selection of specific varieties among vegetables is comparatively easy. Most catalogs offer early, midseason and late maturing kinds in nearly all important classes. Some also present varieties of different colors and shapes. For instance a broad choice is possible in connection with

beans, corn, tomatoes and the like. When it comes to selecting flowers the matter becomes somewhat more complicated. Here colors multiply. As with sweet peas the season of blooming varies with different classes. Dwarf as well as tall kinds are found among asters, zinnias, marigolds and many other popular annuals. These, by the way, are the only flowers considered here, since

perennials constitute a big chapter all their own.

As to experimenting with novelties and specialties, they will arouse your curiosity from the time you sow them. Watching the seedlings grow into plants bearing beautiful flowers or delicious vegetables you never raised before is a reward in itself.

Finally, a few timely tips to *new* explorers of this fascinating field. Start your garden at once by ordering your seeds promptly. Just as the early bird catches the worm, so will the early order receive the most painstaking attention. After seeds arrive check them against your marked copies of the catalogs. While ordering don't fail to include some garden markers needed to carry variety names, date of sowing, etc. These markers or labels will constitute most valuable records throughout the season. And records are absolutely essential to real garden

progress. One additional consoling fact: It is never too late to start a garden. If it's past sowing time, secure seedlings. Most dealers carry a good assortment of both flower and vegetable plants, as the season advances.



COURTESY BODGER SEEDS

NEW VARIETIES ARE OFFERED EACH YEAR

Here is a marigold, always a favorite for color in the garden and as a cut flower

We have received a number of inquiries from teachers and others asking whether extra copies of our Rotogravure Section could be obtained separate from the magazine. Most of these teachers wanted the extras for mounting, posting, scrapbook, or other class projects.

Owing to certain mechanical considerations in connection with printing the magazine, we have on hand some extras of the Rotogravure Sections from October, 1934, to September, 1935, inclusive. These are untrimmed and admirable for the above-mentioned purposes. The task of collating these, and the cost of mailing them, have made us hesitate about announcing their availability. However, there appears to be a definite demand and use for them.

Therefore we are making available complete, unbound and untrimmed sets of the first twelve months (192 pages of Nature pictures) of the Rotogravure Section at one dollar a set, or the first or last six months (Oct., 1934, to Feb., 1935, or March, 1935, to Sept., 1935) at fifty cents a set. Extras of one particular month are available at ten cents each as long as they last and *provided at least ten extras from any one month are ordered at one time*. In the event that one or two months of 1934-1935 become exhausted it may be necessary to substitute separates of October and November of 1935 to complete the twelve issues.

Wooden Fingerprints

By JULIAN D.
CORRINGTON

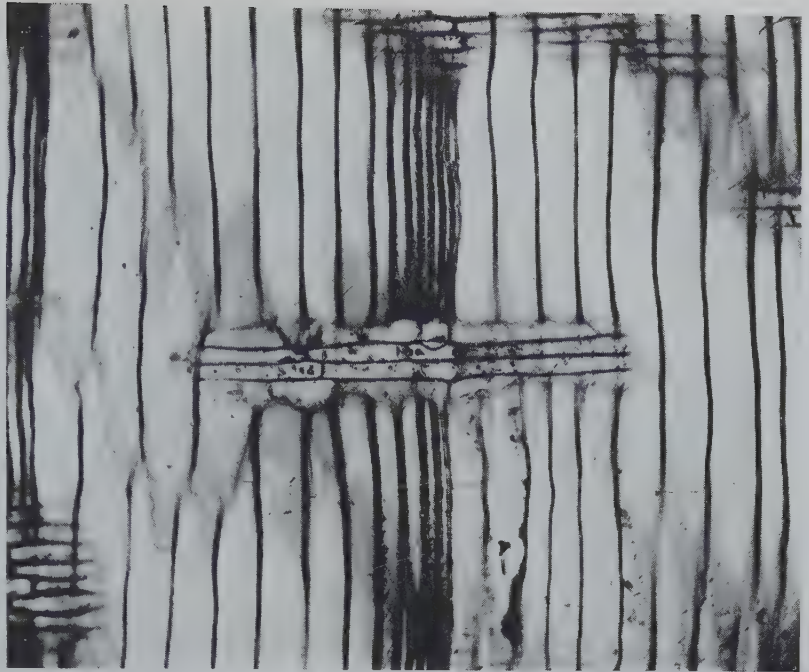
NATURE has a fascinating habit of furnishing keys to those who would unlock her secrets. We tell the age of a fish by counting the annual lines of growth on his scales. We find our way out of the woods by noting that moss and the green alga, *Pleurococcus*, grow on the north sides of trees. And we personally identify each of the many millions of people on earth by studying his or her fingerprints, the pattern of no two sets being alike as seen under a lens.

Of all groups of organic beings, however, none provide us with more intriguing clues than do the trees. Built along similar lines and from the same kinds of materials, each species yet maintains a distinct individuality of detail, and, to the expert armed with a microscope, even splinters, shavings, or sawdust may be sufficient to permit identification of the kind of tree from whence they came.

We recall the amazing testimony of Arthur Koehler in the Hauptmann trial. Here was a man who had made a lifetime study of wood; a man who employed scientific methods, who knew his subject and could back up his statements with proof and data. Just as one observer knows his mushrooms and another his birds, so this government expert knew his trees. What sort of knowledge is this, and what is there of interest in the subject to the average, amateur microscopist?

Trees may be identified by their bark, leaves, flowers or fruit, with occasional help from growth habit, local habitat or distributional range. But such systematic studies are indeed quite removed from the problem of identifying *wood*, either in the form of logs, which usually have had the bark removed, or as planed boards or finished articles of furniture. Different characteristics must now be employed; often microscopic ones. And it is a remarkable fact that, pulverize wood as we must do in making it into liquid pulp for paper manufacture; grind it, dissolve, press, heat and roll it into paper; then tear and grind up this paper again into a pulp and mount a drop for examination under the microscope, and *still* those minute characters can be seen! Still the observer can say, "This paper was made from spruce wood pulp; that other, though, is poplar."

True, this requires more or less expert knowledge and is not the first step to take in learning the microscopy of timber. Let's begin with certain commonly known facts and proceed slowly up the wooden ladder.



PHOTOGRAPH COURTESY WARD'S NATURAL SCIENCE ESTABLISHMENT

PHOTOMICROGRAPH OF AN ANCIENT EXTINCT EVERGREEN

Showing the radial section of the stem. The cellular detail is almost as perfect in this fossil as it would be in a slide from a plant of today

The Boy Scout is shown the annual rings in a stump and learns that he can tell the age attained by the tree before it was felled by counting these concentric circles. Perhaps, later, he finds out what causes them—a rapid spring growth producing a wide zone of light-colored wood (spring wood) and a slow, condensed growth in summer, forming a narrow belt of darker-colored wood (summer wood). The light zone grades into the darker without a sharply-marked boundary, but between the summer wood of one year and the spring wood of the next there is a definite line of demarcation, since all growth ceases completely in the fall and winter.

The record exhibited to us by some of the giant redwoods of Sequoia National Park proves these trees to be unquestionably the oldest living things on earth, some of them going back more than two thousand years.

Again, we visit a maple "sugar bush", or chat with a lumberman, and learn that only the outer zone of a tree trunk contains sap and is actually in a living state, thus distinguishing between the outer, light-colored sapwood and the inner, darker heartwood. These two regions are often plainly seen on surfaces of stumps.

The information of the average person with respect to markings exhibited by wood stops here. Suppose we go a step farther and take a piece of wood and examine the sawed or whittled cross-sectional view; or we can cut squarely across a small tree branch and look at the exposed surface. If there are minute pores, just visible to the naked eye, or clearly seen with a hand lens, our specimen is one of the hardwoods; if not, it is a conifer. These pores, represent the cut-off ends of tubes, the vessels that in life transport water and dissolved minerals upward from roots to leaves, thus corresponding roughly and partially to the blood vessels in man. True vessels are

MICROSTEREOGRAM OF A BLOCK OF SOFTWOOD

This represents a block about one-thirty-second of an inch high and is made from details of studies of microscope slide sections. The key: tt, cross section; rr, radial section; tg, tangential section; ar, annual ring; sp, spring wood; sm, summer wood; tr, tracheids; wr, medullary ray; fwr, fusiform medullary ray; hrd, horizontal resin duct; vrd, vertical resin duct.

COURTESY U. S. FOREST PRODUCTS
LABORATORY

lacking in evergreens, which accomplish the same results by means of squarish cells that do not appear as hollow tubes.

Next, if a hardwood is being inspected, look to see whether or not there are large pores at the beginning of each annual ring, decreasing more or less abruptly in size toward the summer wood, thus producing a distinctly visible ring of holes in the spring wood. Trees with such a formation are classed as ring-porous, while the opposite condition, with pores of practically uniform size and distribution throughout the annual ring, is termed diffuse-porous. Ring-porous hardwoods include oak, ash, elm and chestnut, while the diffuse-porous pattern is shown in maple, poplar, gum and birch.

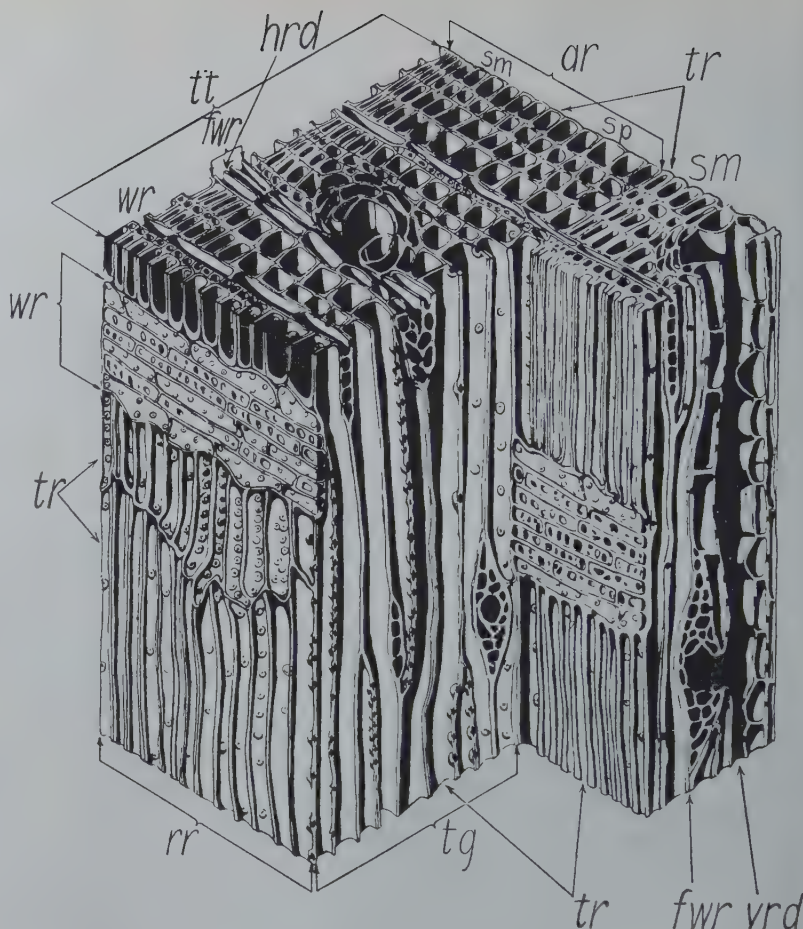
Thus we have immediately limited our quest for the identity of an unknown sample to a restricted class, and, by following out similar refinements, the specimen may be definitely named. To do so, the beginner must learn something of the anatomy and physiology of the tree trunk—the stem of the tree plant—and must know how each of the several components of the stem will appear in three different planes of view. Any textbook on botany may be consulted for structural and functional details.

Study proceeds from the known to the unknown. Using trees bearing bark, leaves and fruit, so that positive identification may be made, specimens are prepared and carefully labeled, to provide a series of models. Unknowns are then compared with this collection. Published photomicrographs of wood structure are also highly useful. One such pamphlet has been issued by the Forest Service.

While the expert can usually determine species by examining splinters, shavings, sawdust and even paper pulp, the beginner will do well to confine his attentions to blocks or slabs of wood, and to sections of stems in the form of microscope slides, purchased or self-made.

A block should be in the neighborhood of 1½ to 2 inches cube, cut so as to present accurate cross, radial and tangential surfaces. It may be sawed, planed or cut with a sharp and heavy knife, but should not be sandpapered or finished in any manner. Wetting one of the surfaces before examination with the low powers (50X) of a microscope brings out detail more clearly.

Slabs may be from 4 to 6 inches in length, 3 to 4 inches wide and of any convenient thickness, as ⅜ or ¾



inch. These may be planed, sandpapered, filled or stained, sandpapered again, then shellacked two coats, with light steel-wooling between coats. Each species should be represented by three slabs, to exemplify the three planes of cutting. Such a collection serves principally in studies connected with furniture or other finely-finished pieces.

For microscope slides, secure young and green stems or twigs and make free-hand sections by paring them with a safety-razor blade. Practice to cut these sections as thin as possible and be sure they are true cross (or other) sections and not oblique wedges. Boiling hard woods for two hours in water will make them softer and easier to cut.

Mix up a stain by dissolving one gram of safranin (the dry powder) in 50 cc of 95% alcohol, then adding 50 cc water. Place the sections in a small watch glass or vial of this stain overnight, then rinse them in 70% alcohol for ½ minute, counterstain in light green (1% in 95% alcohol, i.e., 1 gram of the dry stain dissolved in 100 cc of the alcohol) for ½ minute, rinse in fresh 95% alcohol ½ minute, clear in carbol-xylene (⅓ melted carbolic acid crystals, ⅔ xylene) for 30 minutes and mount in balsam.

Becoming a wood detective involves a certain amount of work and study, but it is loads of fun and has many useful applications. It is one of the numerous interesting, specialized chapters open to students of Nature who go after their quarry with a compound microscope, chief tool of modern science. Devotion to such a subject holds one's interest with the irresistible lure of the unattained.



The Nature Picture of the Month

An interesting and imaginative study of grasshoppers and thistle
by Augusta Zachary of San Francisco, California. This
was chosen for award both for its photographic
excellence and the originality of subject



INTRODUCING THE TARANTULA

*With Lee Passmore as Photographic Master of
Ceremonies*

•

Tarantulas are prominent among the spiders that evoke fear. As with many of Nature's creatures they do not possess the menace with which man chooses to credit them. While the bite of the tarantula may be painful, because of the sharp fangs, it is fatal only to other insects and small creatures on which the tarantula feeds. The fangs are on the tips of the mandibles, and are used for seizing and killing its prey. There are two poison glands that discharge the poison through long, slender ducts that open near the tips of the fangs.

Here we have a large old female tarantula in profile as she walks over the smooth surface of a boulder. Her eight eyes are on the shell-like part of her body, or carapace. These eyes are almost periscopic. Her spinnerets appear not unlike two tails at the extremity of

her abdomen. Tarantulas, however, do little spinning. They do not line the nest with silk and content themselves with only a loose web over the nest entrance.

The tarantula is nocturnal in its habits and remains within the nest during the day as a usual practice. However, they are often seen, soon after sundown, wandering about in search of supper. The average adult, when full grown, has a leg-spread of about five inches. The color is dark brown over the abdomen and tawny yellow on the carapace. The abdomen and legs are covered with long bristles.

There is one time in the life of a tarantula when it is quite defenceless. That is when it is shedding its skin. Then the fangs are soft and useless in battle. Even an ant might kill the largest tarantula at such a time.

Facing its enemy the Pepsis wasp, the male tarantula holds its legs high in the air. Just below the front legs is the right palpus, one palpal bulb showing. Below the palpi are the mandible and fangs. Sometimes the spider has its nest where the ground is bare of vegetation. Here the tarantula must provide anchorage for the webbing that it spins over the nest opening before it moults. Small sticks are collected for this. Also the tarantula will often block the burrow a few inches below the entrance by packing with moist earth, thus keeping out intruders when it is defenceless at moulting time.





There is no danger in thus holding tarantulas. They are really quite harmless and they have to be tormented beyond endurance before they will defend themselves. The mental reactions of persons bitten by tarantulas may cause results attributed to the bite. But unless one is unduly fearful there is no reason to anticipate more than temporary discomfort from the laceration of the spider's bite.

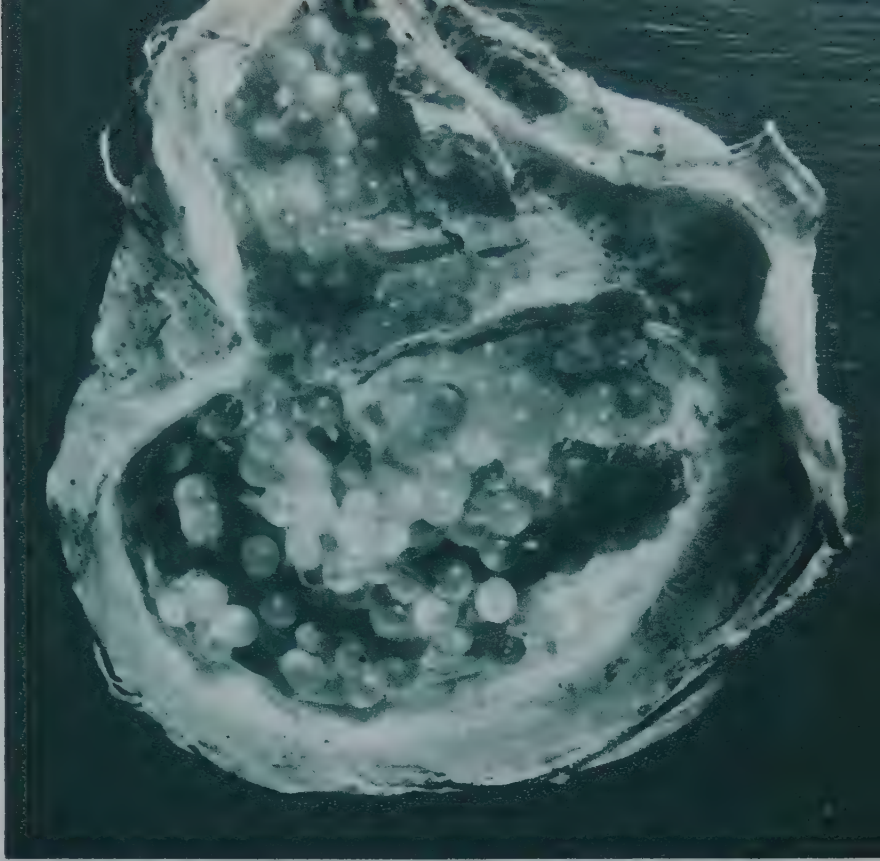
To its prey, however, the tarantula holds more menace. We see here the death-dealing apparatus, en-

larged about eight diameters. The two sharp-pointed affairs are the fangs, used to capture and kill the prey and to dig the burrow. This is dug vertically to about eight inches, and then horizontally with a gradual rise. The nest entrance is about one and a half inches in diameter in the case of a large adult. Most nests are not more than eighteen inches in length. At the extreme end of the burrow the space is somewhat enlarged because it is this part of the nest that the tarantula uses for living quarters.



The eggs of the tarantula, shown in the opened egg sac, are about the size of pearl barley, and creamy-white. Because of their delicacy, the eggs were not counted but estimated to number about three hundred. If a tarantula is disturbed while her eggs are being incubated she will tear the sac to pieces and eat the contents. The growth of young tarantulas is slow. They moult at least once a year; more often if food is abundant. They can go for long periods without food, this food being only the liquid substances of their prey. They destroy many noxious creatures, such as sow bugs and cockroaches.

The egg sac is placed at the extreme end of the burrow, which is slightly higher at this point, and larger, to provide room for the tarantula to move about.





The female tarantula remains in the nest guarding her egg sac. As many as three old egg sacs have been found in a single nest that had been occupied for years.

Four female tarantulas were removed from four different nests within a radius of three feet. Each adult occupies a single nest. The largest of the four might be the parent of the other three. The smallest is about two years old, while the others may be ten or twelve years. The life span of the tarantula is still in doubt. They live solitary lives and should another tarantula enter an occupied nest a fight to the death ensues.





In these pictures Miss Helen T. Farrell has recorded the reactions of lesser scaup to the sudden appearance of corn in the water. First we have a small flock on Indian River, Florida, each apparently wrapped in his own thoughts. The picture at the bottom of the page was snapped a moment after a bag of corn had been thrown amongst the birds.

The scene at the right shows a group of the same species at St. Petersburg. Here they are starting *en masse* toward a desired windfall of food.

This is feeding ducks; if the object had been to kill them it would have been baiting.





A FLAMINGO VERY MUCH AT HOME AND A PART OF ITS SURROUNDINGS IN
THE EDWARD W. BOK SANCTUARY IN FLORIDA

Photograph by ReLand S. Taylor, Omaha, Nebraska



These two pictures, and that on the opposite page, were selected for publication from among the many submitted for award in the Rotogravure Contest. Pictures may now be submitted for the next series, the closing date being March 1. Pictures should be in a size of at least five by seven; contain data relative to the subject and camera used. Twenty-five dollars will be awarded each month for "The Nature Picture of the Month". Other outstanding pictures will be awarded three-dollar prizes.

The young red fox at the den entrance was photographed by John Bart-ram, West Chester, Pa., with a Leica camera. Martha E. Bonham of Cleveland Heights, Ohio, is the author of the picture of the swan parents and their young. She used a Graflex camera.

Lava's Picture Gallery

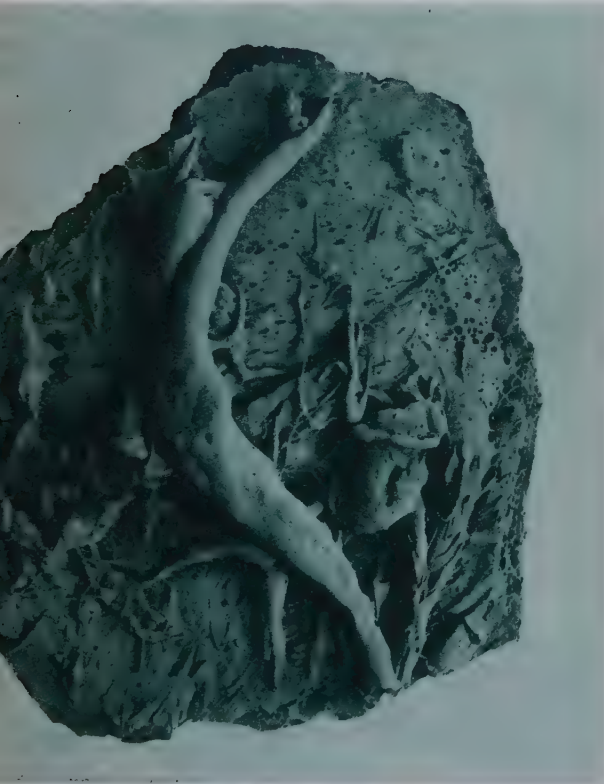
Lava, the liquid rock poured forth in volcanic eruptions, is one of the most interesting of Nature's products. It is rather remarkable that, apparently, no popular magazine article has ever been published about this substance, though of course

many facts about it are given in articles of a more general character relating to volcanoes. In lieu of such an article we are presenting here a selection of pictures that illustrate some of lava's curious aspects and striking performances.

Nowhere else in the world has so much scientific study been made of lava as at the famous fire pit of Halemaumau, in the crater of Kilauea. There is always plenty of lava here, both liquid and solid, for collection and examination. The picture shows the pit in a stage of exceptional activity. Note the lava lakes, partly liquid and partly slightly crusted, and the large central island of solid lava, with jutting crags. Photograph from Dr. T. A. Jaggar.

Now and then, apparently, a volcano indulges in futuristic art. Some queer sculptural shapes are assumed by "spatter" from a lava fountain at Kilauea. Photograph from the U. S. Geological Survey.

Long ago—although not long as geologists reckon time—a series of stupendous lava floods occurred over 250,000 square miles within the present boundaries of Washington, Oregon, Idaho and California. These streams of lava came through earth fissures. Large areas of lava blocks and clinkers still remain. U. S. Forest Service Photograph.





Mark Twain, describing a visit to the volcano of Kilauea, tells of seeing "a railroad map of New England done in chain lightning." Above we see what

he saw. The picture was taken looking down into the fire pit at night. The glowing lava can be seen through cracks in the temporary crust, while here and there fiery fountains gush forth. Photograph from Dr. T. A. Jaggar.

Where a great flow of lava has taken place in a forest the remains of many trees are found completely encased in solid lava and assuming all sorts of fantastic shapes. The example above is in a forest near Kilauea, Hawaii. Photograph from the National Park Service.

Lava hardens and cools at the surface very rapidly after it issues from a volcano. The formation of an under crust, which is a poor conductor of heat, explains the remarkable fact that lava sometimes flows over a field of snow without melting all the snow below it. Another result of crusting is that the lava below the surface sometimes drains away, leaving a tunnel, known as a "lava tube". There are many of these tubes near Kilauea, although none so big as one on the extinct volcano of Mount Shasta in California. This one is sixty to eighty feet high and more than a mile long. Photograph from the National Park Service.

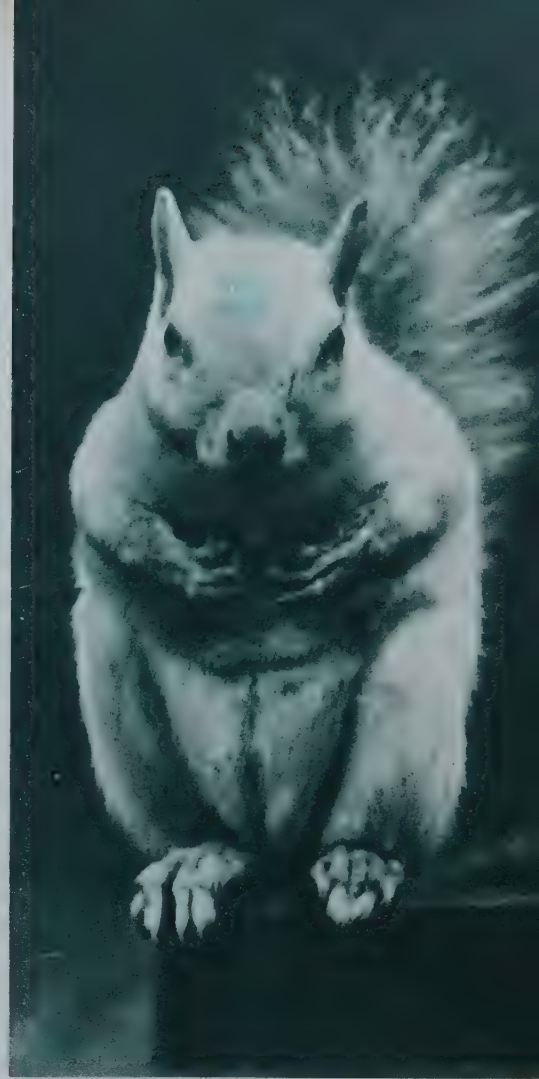
The upgushing or fountaining of lava is responsible for many interesting formations, including spatter cones. When liquid lava is thus flung up in the air, the wind sometimes draws it out into long threads that look like spun glass and are known at Kilauea as "Pele's hair". Photograph from Dr. T. A. Jaggar.





Frequently seeing things in clouds requires a vivid imagination, and the clouds refuse to stay still long enough to afford photographic proof of what you thought you saw. However, Ruth Miller saw Lincoln's profile and this picture proves it. The nest and eggs of a loon are not often found, even though the birds may be common in a region. Frank Richardson found one and photographed it near Pinewood Camps, Cantorl, Maine. The watch shows the size of the eggs.





Albinism is an interesting trick of Nature but instances of it among birds and mammals are often given far more publicity than their actual rarity warrants. We have here a group of pictures that indicate the frequency of this freak, which is caused by the lack of pigment in the system of the animal. This lack, for example, frequently causes weakness of the eyes, as with the sooty mangabey that is shading his. The albino gray squirrel has the usual pink eyes and the albino Norwegian reindeer stands out from his fellows.

Photographs from William Thompson.





Although she is an albino, her lack of pigment has in no way affected the mother instinct of this nanny goat. Albinism is quite frequent among members of the dog family, as with the wolf. The white kangaroo makes a striking display since the difference in its color from the normal is so marked.





Birds as well as mammals often turn out to be albinos. Robins seem to be particularly susceptible and many instances of white robins are reported. This albino lapwing, or green plover, is a striking bird, with a few feathers suggesting its normal color. The black-footed penguin is a semi-albino, being endowed with some pigment but not enough to go around. The little albino buffalo is a member of the herd now protected on the National Bison Range.





Four more instances of albinism that add to the evidence that there is no reason to get particularly excited upon the discovery of another. The attractive little palm civet is made more so by its unnatural white coat. The white slow loris, odd and slow-moving relative of the monkeys, finds its white coat an effective contrast with its strange, big eyes. In fact, the color also becomes the muntjac or barking deer. We have all heard about white elephants as a figure of speech and may have seen what purported to be a white elephant in the circus. Not infrequently circus albino elephants come by their reputed hue through the careful application of a coat of whitewash. Here, however, we have a real white elephant of Burma, shown with a normally-colored companion.



★ Conservation ★

A section of *Nature Magazine* devoted each month to the expression of practical opinions on the vital issues affecting our use and abuse of natural resources, including wildlife, and dedicated to the purpose of assisting Americans to play a militant part in the attainment of constructive conservation aims.

ARTHUR NEWTON PACK, *Editor*

WILDLIFE ★ CONFERENCE

President Roosevelt has issued a call for a national wildlife conference to be held in Wash-

ington February 3 to 7. This meeting will, we assume, replace that originally planned by the new-born American Wildlife Institute, the latest national organization of sportsmen formed to protect their rights to do as they please. Mr. Roosevelt's meeting will be on a much grander scale. It plans to bring together delegates numbering twice as many as the Congressional delegation from each State—some 1200 persons. The meeting will discuss conservation from various points of view, and the original announcement vouchsafed the guess that no legislation will result from the meeting, at least directly.

We gather that the idea of this conference is to bring together all phases of conservation viewpoint and to encourage the voicing of all shades of opinion. It may be of distinct value if it does this, and if the meeting is not dominated both in its program and its conduct by sportsmen's organizations and fish and game officials who may logically be expected to influence the selection of delegates.

We hope that this meeting may be a means of placing before the American people the truth about the sad state of many of their renewable natural resources. We hope that all extremes of opinion will be thoroughly and frankly aired, and that, as a result, we may all discover just how far apart these extremes really are.

Mr. Roosevelt's conference should result in much-needed publicity for conservation. This may probably be its greatest asset and a valuable one, at that. It obviously cannot be a deliberative body with any action it might take regarded as binding or finally authoritative. This could hardly be expected from a group to be selected in as haphazard a manner as this one—from present information—seems destined to be.

We shall, therefore, look forward to this conference with interest and anticipation. We shall participate in it insofar as we are privileged. We shall hope that from it will come relief for our sorely beset wild creatures, and for such of our other renewable natural resources as are intimately connected with their well-being. If we are to keep them, all our people must come to realize the oneness of conservation needs.



THE SANTEE PROJECT ★

Of the multitudinous projects spawned in the name of work relief and public works, that for

power development on the Santee and Cooper Rivers in South Carolina is, perhaps, the least justifiable. In fact, there seems to be no practical excuse for it, unless the expenditure of twenty-five million dollars to save personal political chestnuts from the fires of defeat may be termed an excuse. For little more than the propitiation of South Carolina voters, the Administration seems eager to destroy about one hundred square miles of the most important wildlife area remaining on the Atlantic Coast. Its biological importance and its economic significance from the wildlife viewpoint so tremendously outweigh any possible value as a source of power that the project would be ludicrous if its results did not promise to be so tragic.

We seriously doubt that Mr. Ickes really favors this project, even though he must defend it. The widespread opposition to the Santee-Cooper idiocy finds Mr. Ickes in a particularly touchy frame of mind, choosing to answer attacks on the project by interpreting them as reflections upon him as a conservationist. Yet in his somewhat vehement personal defence we have been unable to discover any argument, however small, in justification of the project itself.

Jay N. Darling, former Chief of the Biological Survey, has suggested that if this twenty-five million must be spent in South Carolina for political chestnuts it would be better to pass it out where it would do the most good instead of ruining forever an irreplaceable resource. While we don't much care who represents South Carolina in the United States Senate, we are for anything that will preserve this Santee-Cooper region from being sacrificed for the ballot box.

SHOOTING IN THE ★ SUBURBS

Is it consistent with our American civilization that a housewife must take her life in her hands to hang out her Monday wash during the hunting season? Are we unable to cope with a situation that makes it necessary to keep children in the school buildings during recess periods lest they be shot for deer?

These may read like overdrawn, even humorous, questions. They are not. We submit the following letter from Mrs. H. W. Bay of Bound Brook, New Jersey, as something that demands an immediate answer and action from those within whose power that action lies. Mrs. Bay writes:

"I wish to congratulate you for giving your many readers your splendid editorial, 'Saving or Shooting'. I only wish it could be printed in every newspaper in the country.

"Just what are the great number of unorganized Nature lovers and conservationists in this country going to do about combating the so-called 'sportsmen'?

"To one who lives in a small suburb and who has her property posted, and who is every day almost pestered to death with pot-hunters who have no regard for 'No Trespass' signs, it is a vital question.

"When, oh when, is this country going to wake up to the fact that all our wildlife is disappearing? And why do we allow whole armies of young boys to wander over our posted lands—boys who are children of aliens and immigrants and who have no respect for our American property rights?

"This section of the United States is too thickly populated to allow men to have guns, let alone shoot them. I wonder how many women in suburban and rural districts feel afraid to hang their clothes on the line on wash days? How many rural schools do not allow their children to run in the school yards because of the deer hunters? I am sure that thousands of women are not

only annoyed but in danger of their lives in this way every year, and to them the hunting season is a thing to dread.

"In this section the State Police are a great help, but they can't be everywhere, and, anyhow, why should they be put to all this bother just because a small army of selfish men want to kill something? And why in the name of common sense does our government allow such men to endanger the lives of the rest of us.

"Property owners are angry about this situation. What can we do about it in the face of the strong 'sportsmen's societies'? These men take the wrong attitude that the people who want to preserve the game are doing them some kind of harm, and they hate us so unreasonably. I contend that if they want to hunt they should go to less thickly populated sections than North Jersey."

North Jersey is not the only section so afflicted. This same situation is duplicated in many sections. We are reminded of a little pamphlet "*A Farm Woman Speaks*" reviewed in our columns a few years ago. It details experiences involving actual danger from insolent trespassers on the property of an Oregon family. It seems to us that the answer lies in strict regulation of the possession of firearms. The human animal seems to have no more sense of proportion of the rights of others when behind the trigger of a gun than he does when behind the wheel of an automobile. Death-dealing weapons should not be allowed to go indiscriminately into the hands of the ignorant and irresponsible. Every instrument that emits shot or bullet should be registered and licensed and that license should be revoked and the instrument taken up whenever it is illegally used. This is no longer a pioneer nation whose men must defend themselves from the attacks of the rightful owners of the land they are settling, nor need they have firearms to kill for food.

FAKE EAGLE STORIES

EVERY now and then stories appear in the newspapers graphically describing how an eagle has flown off with a baby. The inevitable effect, and, now and then, the object of such tales is to place this splendid bird in bad odor and lend further support to the persecution to which it is now subjected.

The most recent of these fake "eagle carries away child" yarns was reported in the press all over the country with a Hugo, Minnesota, date-line. A golden eagle was said to have gone off with a nine-months-old baby. The National Association of Audubon Societies investigated. From their field representative, J. P. Jensen, they got the truth. Mr. Jensen reported:

"A golden eagle, with a wing spread of 86 inches, was apparently pursuing a hawk, and in its flight it was caught between two automobiles on the pavement of a city street. It flew upwards and was electrocuted by a high tension wire, just above. The eagle was only slightly burned and is being mounted by Mr. Arnold Lindberg. The baby in the case, and its mother, were, at the time of the eagle incident, 260 miles away visiting, and the story was given to the newspapers as a joke."

Authorities have yet to find a substantiated instance of an eagle attacking a child, and the Audubon Association asserts that "such yarns are nonsense. An eagle

couldn't lift more than its own weight of 10 to 14 pounds if it wanted to."

This is a type of story that enjoys widespread circulation. It perpetuates a myth that long ago should have been rejected by intelligent persons, since there are no witnesses to such a case, but is relatively harmless, for few have a chance to kill one of these supposedly dangerous birds.

But there is a more dangerous type of propaganda that seems deliberately designed to encourage the destruction of eagles. We refer to articles recounting eagle-shooting exploits that appear in sportsmen's magazines. Our attention has been called to a particularly dangerous example that we propose to review in an early issue.

Dedicated to the acquisition and preservation inviolate of the last remaining virgin deciduous forest in the State, the Save-Kentucky's-Primeval-Forest League held its organization meeting in Lexington, Kentucky, in early January. The meeting was called by the Conservation Chairman of the Garden Club of Kentucky. The announcement of the plan of the League resulted in a large response from lovers of the wilderness even before the formal organization meeting was held. Information about the league may be obtained from Mrs. Bailey Wootton, Frankfort, Kentucky.

THE PUBLIC DOMAIN— UNCLE SAM'S STEPCHILD

By ARTHUR NEWTON PACK

WHEN the story of conservation is written, historians will find some embarrassing moments when explaining the attitude our Government sometimes takes toward our national resources. But none will be harder to explain than the present crazy-quilt pattern for taking care of the Federal grazing lands.

Of course, for a time we simply didn't take care of them at all. They constituted the great open range of romantic memory, where men grazed their herds when and as they pleased. Later, with the creation of the National Forests, the grasslands inside forest boundaries were cared for by the Forest Service. But the 200 million acres of Public Domain, that great western No Man's Land under the jurisdiction of the Department of the Interior, still remained unprovided for.

For some obscure reason this Public Domain has been a stepchild of government. Its Federal guardian did nothing about it, although on every side, serving as an example of what could be done, were those grazing lands of the United States Forest Service, under the Department of Agriculture. Here, for more than a quarter of a century, the Federal foresters had been dealing with problems of improving grazing conditions and endeavoring to protect the soil, which is the most necessary and fundamental type of conservation. As a matter of fact, they were the only ones who were thinking about it—grazing was one of their major activities. Through long study, through repeated trials and plenty of errors, through conferences with stockmen, the Forest Service has slowly evolved a system of permits that allow stock owners to graze their cattle and sheep on National Forest ranges, and at the same time protect the range itself from overgrazing and abuse which leads to erosion and irreparable destruction. Naturally, their regulations did not suit everyone. That could not be expected under any system of government management. But by and large the Forest Service, dealing at firsthand with the stockmen, knowing their difficulties, and studying their problems, has reached a workable adjustment between the public good and private interest.

It was this visibly progressive success in conserving the range within the National Forests that led conservationists to demand that some form of protection be afforded the grazing lands on the Public Domain. The more substantial stockmen, too, wanted something definite done about that vast acreage; and so at last, in 1934, in reluctant deference to a nation-wide demand that something be done, the Government decided to provide some kind of grazing management for its orphan acres. As a result, the so-called "Taylor Act" came into existence—an Act to administer the grasslands on part of the Public Domain. But under the Act an amazing thing happened—the re-

sponsibility of caring for the grass was not placed in the Department of Agriculture with its long experience behind it. It was left in a Department that had never in its long ambiguous history had the slightest thing to do either with grazing or with agricultural research—the Interior Department.

Of course, there may have been a reason. The Interior Department for some time had been casting about to find something for its Land Office personnel to do, and now Providence, working through the Congress, placed in its lap this new responsibility. Everything was working out nicely for the Interior Department, and the fact that Federal grazing was to be cluttered up with a wholly inexperienced agency utterly unfitted for that type of work seemed to matter not at all.

To date, what has been done under the Taylor Act is to set up grazing districts, appoint advisory boards and issue temporary licenses. To be sure, transient stock has been largely eliminated, but up to the present time, that is all. Little or no attempt has been made to determine by any method of scientific or practical nature how much stock a range should carry or what should be done to improve the very conditions that have become a national scandal. In one or two places so-called "range experts" have been called in, but to the certain knowledge of the writer those so-called "experts", lacking practical experience, have in several instances estimated a grazing quota larger than the experienced stockmen operators themselves know could be supported on the land. This is a curious kind of conservation.

In carrying out the Taylor Act, the theory of the Department of the Interior was that necessary regulation of public property could be secured largely through the stockmen who used the land, and therefore had a practical, long-time interest in maintaining the range. But this policy of placing responsibility for public land administration upon private stockmen has its drawbacks. The better class of stockman realizes that a great many small stock owners are a detriment, not only to the industry itself, but also to the very existence of the range. Many of them have little to lose. They are migratory and irresponsible, and to talk of self-government in their case is to turn one's back deliberately on reality and the needs of reality.

Under the theory of grazing regulation by the self-government of stockmen, the governing responsibility must therefore be put into the hands of the large and powerful stockmen who, because of the extent of their investment, have a practical interest in the future. As owner and operator of range land in New Mexico, and, therefore, as a stockman myself, I realize in what a curious position such a stockman is placed. He is supposed

to stand as judge over the little fellow, a principle which, however practical it may or may not be, is hardly going to be considered democratic. The little fellow is bound to protest, pull political wires, and generally make trouble, and where there are many "little fellows", the whole theory is likely to break down.

There are many responsible stockmen who thought, and some who perhaps still do think, that they prefer this principle of self-government, but a change is already to be noted. Recently I had occasion to talk with a well-known and respected rancher of a neighboring state. "This Taylor Grazing Act," he told me, "has put me in a bad situation. Not long ago they asked me to serve on one of their advisory boards, and last month referred to me the application of a neighbor for two thousand head of sheep. I knew he did not have that many sheep, and when they called on me to make a statement, I had to tell them the truth. The Interior Department gave me the case to investigate. I investigated as honestly as I could. I found out exactly how much the man owned and made a report to the Taylor Act people. As a result, his application has been turned down and I have made a mortal enemy for all time. The same thing has happened to more than one of my friends. Now, I say it is not fair for Uncle Sam to put on me the burden of telling what my neighbor has or has not. Uncle Sam should himself have taken that action. This isn't a good country to make enemies in, and, if the Government keeps trying to make private detectives out of us, all feeling of neighborliness and mutual trust will be lost."

Yet, even if this conflict of theory in the administration of grazing did not exist, why should the Government divide its grazing activities between two departments? If agricultural crops should be placed under the Department of Agriculture as a logical and normal procedure, is there any good reason why the Interior Department should select one form of agriculture and attempt to administer it, especially when pasture land is so intimately connected with agricultural crops? No one, certainly not Mr. Ickes, has ever answered that question.

Nor is grass the only valuable resource needing protection on the Public Domain. What of the watersheds? What of wildlife? It is vitally important for this country as a whole that those Public Domain watersheds be protected at least as thoroughly as the Forest Service is protecting its watersheds on the National Forests, and it is equally important that our vanishing wildlife be intelligently administered. But here, too, the Interior Depart-

ment is stumped. There have even been recent bureau conferences within the Interior Department, by which it was proposed to turn over the administration of certain wildlife refuges on the Public Domain to the National Park Service. Apparently, the chief reason for this was the bureaucratic one of keeping control in the Department of the Interior and away from the Department of Agriculture. In my own State of New Mexico, which, fortunately, possesses a conservation-minded Game and Fish Commission, special regulations of the Interior Department permit the state interest to control wildlife in the grazing districts, a plan which, in this instance, may prove effective, but which could not be applied in all states at present without serious danger of having little or no wildlife left.

Meanwhile, confusion, duplication, and red-tape continue to multiply. In New Mexico there are now three separate agencies of the Government telling me how many cattle I should graze—the Agriculture Department Forest Service, the Interior Department Grazing Service, and the new Soil Conservation Service. And of the three, the Forest Service alone has any background of experience and trained personnel, except in so far as a few men trained by the Forest Service have been taken over by the other agencies.

It is a natural thing, perhaps, for an untrained, inexperienced agency to disclaim as much responsibility as possible, and the Interior Department has already said in effect to the stockman, "If this Taylor Act is a failure, it is your fault, for it is your Act. You administer it, and you are responsible for it." As a graceful and, let us say, a politic gesture, such an attitude may have advantages—until the day comes to pay the piper. And it may not be an entire coincidence that this has happened at a time when the Interior Department is striving desperately to become the Department of Conservation, in order to spite its agricultural rival.

And what is being accomplished? As far as the Public Domain or the interests of the stockmen are concerned, practically nothing. The moral is not hard to point—stop this duplication; put an end to this red-tape and confusion. Stop all this inter-departmental politics and lust for power at the expense of the decent administration this country has a right to demand. As far as grazing on Federal lands is concerned, place it all under one Federal agency—preferably the one agency that has the trained personnel and experience to do the job, the Department of Agriculture.

FEWER WATERFOWL

"I have been very much interested in our migratory waterfowl," writes R. O. Ewinger, President of the Iowa Division, Izaak Walton League of America, "and have spent a great deal of time trying to bring about a closed season. I have been a duck hunter for the past thirty years, and have made an extensive study of these

birds. The duck season has just closed for this fall and I regret to inform you that fewer ducks migrated down the Mississippi Valley this fall than ever before. The evidence is very plain that if they are not given a closed season for at least two years the sport of duck hunting will be a thing of the past by 1940, as Dr. Hornaday predicts."

MIGRATORY BIRDS OF NORTHWESTERN ALASKA

By C. L. ANDREWS

INTO Alaska, in early summer, pours a multitude of migratory birds seeking nesting places. They come from strange and distant lands, and some have flown the length of the continent—from Patagonia to the Arctic—to rear their broods.

The far Northland, south of and beyond the Arctic Circle, from Kotzebue to Baffin Land, with the western and southern coast region of Alaska, is the last breeding ground of the migratory waterfowl of America. That lake-spotted country, from Bering Strait to northern Labrador, still presents the wild, open spaces for nesting that it did a hundred years ago, and with few more people.

Above the Arctic Circle in Alaska is an area of six hundred miles east and west and two hundred miles wide. Then there is the region along the Bering Sea at the mouths of the Yukon and Kuskokwim Rivers, and still farther to the south and east the marshy flats of the Nushagak, Cook Inlet, and Copper River. These areas comprise some three hundred thousand square miles, and have a population of only about fifteen thousand people, or about one person to half a township. Wide areas are not invaded by either White, Eskimo, or Indian, and here the feathered visitors may multiply undisturbed.

The northward flight reaches St. Michael, at the mouth of the Yukon, during late April or early May, according to the season, and continues through May, and into June. By the middle of May the ducks, geese, swans, and cranes reach the Kotzebue Sound country, and their calls, carried far on the still air, come from the lakes and river flats. From there they spread northward, sending recruits out into the side valleys, some stopping in the Kivalinik, others on the Pitmegea, the Utokok, or the Kook near Wainwright Inlet, and many pass Barrow and go on to the east toward the Colville River.

The eider ducks and some of the geese have already gone up the coast, and from Point Barrow have flown out over the vast ice-field of the Arctic Ocean toward the northeast. The eiders—king, Pacific, and spectacled—take this route, over the open lead that reaches from Point Hope almost in a straight line to Barrow. Somewhere beyond, in that broad, white desert of ice, they know of places to nest.

The stay of these feathered visitors in the Northland is brief and busy. It is filled with the anxieties of bringing their families into existence and raising them to the point where they can launch out on their southern journey before the coming of winter.



THROATED GEESSE IN SUMMER

One of the smaller races of Canada goose on its breeding grounds in northern Alaska

The waterfowl, counted as game birds, are many in kind and a myriad in number even yet. Most important are the geese, the most beautiful being the Emperor goose, which seldom breeds farther north than Kotzebue Sound, or winters farther south than the Aleutian Islands. Its preferred nesting-place is in the delta of the Yukon River. The large Canada goose, the honker so desired by sportsmen, is rarely found so far north as the Yukon, but is plentiful from Nushagak to the Copper River. Its smaller relative, the Hutchins goose, has its favorite haunts on the shore of Bering Sea, and the cackling goose is commonest from the Yukon to the Kuskokwim. The white-fronted goose is here one of the most widely spread species, and is found from the mouth of the Yukon to Barrow. The black brant goes farther to the north than the others, and formerly passed St. Michael and Stewart Islands in great numbers. The lesser snow goose closes the list of these birds found in this region. It goes as far as Barrow to nest.

The duck family is well represented by the pintail, the baldpate, the old-squaw, the green-winged teal, the red-breasted merganser, the mallard in the south, the harlequin duck and four kinds of eiders, and more rarely by the shoveler and goldeneye. The pintail is the widest distributed of these, and is found from St. Michael to Barrow. There are also the American scoter, the white-winged scoter, and the surf scoter, the last being known to the Eskimo as the *doonak*, or devil duck. The queerly marked harlequin duck is a tenant of the rivers and lakes, generally in the interior. The mallard breeds mainly in-

land, and is relatively rare at the mouth of the Yukon.

The whistling swan nests in decreasing numbers as far north as Barrow, but is rare north of Kotzebue. It flies by twos and threes in the early part of May on Kotzebue Sound, and at the mouth of the Noatak River. To the Eskimo it is *koogruk*, the loud-speaker.

The little brown crane is frequently met along the coast, on the Seward Peninsula and as far as Barrow, generally paired for nesting by the time they settle on the tundra or at the mouth of some river on the wide flats. Their rolling call "kroo-oo-k, kroo-oo-k", rings as it used to years ago on the camas beds of the Willamette Valley, and the birds go through their grotesque dances in the North as they did in the Oregon valleys.

The eiders, perhaps among the least known of the ducks, are plentiful, and seem to be holding their own in numbers better than any other, probably because they seldom venture farther south than the Pribilof and Aleutian Islands. The king eider, known as *kingalik*, or big-nose, by Eskimos, owing to the large yellow protuberance above the bill,

goes farthest north, generally, of all. In great flocks they fly along the coast above the long lead, or break in the ocean ice, that opens in the sea in spring from Point Hope to Point Barrow, commencing about the last of April and continuing for over a month to pass on and out over the ice of Beaufort Sea into the unknown region to the northeast. They are accompanied by the Pacific eider and the spectacled eider. In the fall they return, the drakes coming first; beginning the latter part of July they strike the coast a little east of Point Barrow. From there they fly westerly along the low coast to pass over the sandspit at the Elson Lagoon at the old Eskimo village Perynu, and continue down the coast. In the days when the Eskimo depended almost entirely on the wild game, they gathered here from afar to garner the flying harvest. Lines of birds of from ten to fifty in number came from the eastward, great, heavy-bodied drakes, weighing eight to ten pounds; flying like bullets just above the water and then sweeping over the low sandspit they presented a tempting mark for the bird spears, arrows, and bolas of the Eskimo. Later the females and young follow.

The Pacific eider accompanies the king on the northern flight, but it is more a frequenter of the coast of Bering Sea and the Alaskan coast than the other. Steller's eider, which the Eskimo knows by the term *Ignikoktok*, meaning touched-with-fire, from the reddish-tinged breast feathers, breeds as far south as the Near Islands, and along

the shores of Bering Sea, and up to Point Barrow. The spectacled eider also breeds sparingly along the northern coast. The Eskimo name is *Too-too-luk* or spots-around-the-eyes. These are the names used by the northern people, on the shores of Bering Sea; names differ in various sections.

A list of the northern summer birds would be a long one, for the long days encourage insect and plant life in myriad forms, and food is abundant. There are robins, swallows, blackbirds, longspurs and marsh sparrows. Plovers, golden and black-bellied, sandpipers of several species, red and northern phalaropes, snipe, curlews, turnstones and yellow-legs circle and call, intent on their business of raising families.

Gulls of many kinds abound, some of them very beautiful, and including the rosy gull, the ivory gull and others not seen in the south.

The natural enemies of the breeding birds are many, waiting to kill the mothers on the nests, to eat the eggs, or to catch the young before they attain strength of wing to escape. There are foxes, white, blue, red and cross,



A NEST IN ALASKAN TUNDRA

The nest and eggs of the pintail duck, which is widely distributed through Alaskan breeding grounds

prowling through all the hours as the sun swings its continuous course in the heavens, just dipping toward the horizon, then rising for another circle. The lynx is there when the white rabbit and ptarmigan abound, and it does not scruple to prey on anything it can conquer, even to the caribou. The raven, second cousin to the crow, hunts over the tundra. The great white owl, *ook-pik*, flits by on noiseless wings, and there are other owls and hawks. Perhaps the greatest of the bird enemies are the jaegers, of which there are three species, the pomarine, the parasitic, and the long-tailed. To the Eskimo the jaeger is the sea robber or tundra hawk and it fits either name. They are the pest of the fishing gulls; soaring above where the gulls and terns are diving down to take herring or smelt, they pounce immediately upon the unlucky fisherman that makes a catch and, dodge and twist as the victim may, it finally has to drop the fish with an angry cry, and watch the robber seize it before it reaches the water. When not engaged in this nefarious pursuit they fly swiftly and low over the flats and slopes frequented by the smaller birds, keen eyes searching the ground as they pass, and there is no mercy for the victim spied.

Mankind is the lesser evil in the northern land. The Eskimo take fewer of both birds and eggs than they did in past years, and still use some for food, but their inroads would never have decreased the supply. The birds are the chickens of the Eskimo, and his flocks have sadly

decreased in the past fifty years. While the predaceous animals and birds take their toll, Nature would have kept the supply at its former abundance had it not been for the incessant kill by man from the time the birds reach the South until they again turn northward. They leave their nesting grounds as soon as the young are ready to go, and return just in time to begin breeding, so the resident of the country that produces the crop gets scant time to reap any of the harvest.

Few of either white or native get as many birds in a season as the game limit for one day was in Washington a few years ago. In seven years' residence in the far North, from Nome to Point Barrow, I killed fewer ducks and geese than I have seen unloaded from an auto from a shooting preserve in Washington.

To the Eskimo the bird life is a boon, and in primitive days it made living in summer easy. The months of the Eskimo are moons, as they are for the Indian. He names them *tatket*. His generic name for bird is *tingmeat*. Some of the months are named for some event that connects his life with the flight of the migratory birds. *Kaliaturi-tatket*

is the moon-of-the-broadwinged-hawk. *Tingme-tatket* is the moon-of-all-kinds-of-birds. July is *Kahwil-tatket*, the moon-when-ducks-cannot-fly, on account of moulting. Some other summer months are not named by some of the communities, because they say, "So easy to live, no use to keep count. In winter so hard to live, count how long all the time." This indicates how closely the life was formerly linked with the procuring of a bare subsistence in the Land of the Long Night, where they call January *Sikinyach-cheak*, or the moon-when-the-sun-begins-to-come-back.

Whenever you hear of anything particularly new and ingenious it is nearly always discovered to be of Chinese origin. Methods for taking game have always been in the foreground, but such a one that no white man would be likely to occupy. There is the tale of the astute Celestial who observed that the wild ducks settled in the middle of a shallow pond but never came near enough to be shot or caught. Making himself a huge hat of green grass and reeds, he waded very slowly towards the ducks, submerged to the nose, his head completely hidden. At last, finding that the ducks did not notice that the island was moving, he succeeded in getting close enough to pull them under water by the legs, drowning each so silently that the others were not frightened. It is a good

The great Northwest, with its wide reaches, still nourishes myriads of birds, large and small, that spread over the land in the bright, glorious summer months. On its wide expanses the air is filled with the flight-song of the longspur. The old-squaw duck, the *ab-bah-lik* of the Eskimo, tells his name to the wilderness. The loon's call comes from the sky, or from some half hidden lake where the nest is concealed on a reedy spit or island.

But the wild bird life is disappearing in the North, as it has in the East and West. The blue grouse and the sage hen have gone from many places in Oregon. The flocks of waterfowl that in former years passed in long strings for days are there no more. The mallard duck that nested in the wheat fields of the pioneer is no longer found there. The same thing is happening in the North. There is a great bird reserve at the mouth of the Yukon River, which was once one of the most prolific of nesting places. An old river steamboat captain who has settled at the Aphoon mouth of the river says: "Not one duck or goose comes to the mouth of the Yukon where there were a hundred in



TYPICAL NORTHERN TUNDRA

It is such areas as these breed many migratory waterfowl that winter in southern lands

1898." Almost the same words come from wintering grounds in the States.

If the hunters of the southern land will just let enough birds escape their rapid-fire guns to go north to breed, there is room there for them to restore the flocks for ample flight during all future time. Today not enough are returning to reproduce the loss. If this decline is not checked soon the wild bird shooting in the fields and marshes will vanish, as the sea otter did on the waters of the North Pacific before the hunters of the Nineteenth Century.

trick, if he did it, but it is not likely to become a popular sport. But, since hawking and archery for game are both coming back into fashion, because the destruction of wildlife with a gun has become too easy to be amusing, it may be worth some sportsman's while to start a stable of trained cormorants. It is beautiful to see a cormorant's skill in fishing, and the fascination of having your own trained bird flying free and bringing game to your boat ought to appeal to jaded appetites. Presumably the first birds could be obtained from China, and the training of cormorants can be no more difficult than the training of a falcon. Here is something to satisfy the sporting instinct which need not become the public menace which the sports-gunman is beginning to be. STEPHEN HAWES.

Boys Are Killing Our Birds!

WE, as Nature lovers, have a tendency to let things just rock along, and think everything is going to be all right. The pitiful part of it is that it won't be all right. This is especially true of our inactivity towards trying to teach our boys not to kill birds.

Many people think that boys used to kill birds but that they know better now. I have had lots of experience to back the statement that they are nearly as bad as they ever were. I have read many bird books, and not one of them has mentioned, among the bird's enemies, the boy, which is their worst one. I honestly believe that the boys of America kill more birds in a year than all the cats, strays and pets combined, kill in the same length of time. Some boys average several hundred birds in a year, not counting the nestlings left to starve or the eggs that spoil after the death of the mother. Indeed, nesting birds are favorite victims simply because a bird sitting on the nest is usually loath to leave it.

One would think only vagabonds and bullies would kill birds, but many so-called nice little boys kill them, too. And what do they do with them after they kill them? Why most of the time, they do not even look at the dead birds. They are left right where they fall while the little birds back in the nest starve to death. Boys become skilled marksmen with those accursed "nigger shooters" and air guns, or, in some cases, shot guns, and kill every bird they see. I have known cases where traps which cut off both of the bird's legs are used. Sometimes they are caught in wire traps and either left to starve or taken out and tortured. Very few of the birds that are shot with "nigger shooters" (the most common instrument of destruction) die quickly, but die after hours of suffering or fall prey to one of their natural enemies that never could have caught them otherwise. The birds killed by boys are not likely to be English sparrows. Whenever a nest is found, the eggs are thrown out and dashed against the ground or go into some use-



The author and his pet deer, Geto. And, below, the letter that accompanied the article to the office of Nature Magazine:

"Edgar is thirteen years old now. When he was only five, I found him sitting on the porch steps stroking the lovely blue plumage of a dead grosbeak while the tears ran down his cheeks. A Mexican boy living on our ranch had killed the bird and brought it to him as a gift. As we talked the matter over, Edgar said, 'Mother, let's give Joe Nature Magazine so he will learn not to kill the birds.'

"Then when Edgar was old enough to go to school, he came home one day and told me, 'The boy hit me hard, but the cardinal got away and so I didn't mind.' It developed that a playmate was trying to kill the bird with his 'nigger shooter' when Edgar grabbed him and held him until the feathered friend flew away.

"Last year he asked to dye dozens of eggs for an Easter hunt which was given for a large group of younger children. The reason for his request was clear when the eggs appeared with pictures of birds, which he had drawn upon them, and statements: 'Do not kill the birds, for they are friends to man.' 'Protect the birds.' 'Birds destroy crop-eating insects.' Out of the boy's deep abiding love for the birds came the enclosed article by him. I have typed it just as I found it on his desk.

Edgar's Mother."

boys not being Scouts and some Scouts that break their rules, there is still much work to be done.

Bird books are helping to teach boys that it is not right to kill birds. A friend of mine was bad about killing them. I gave him a book entitled *Birds*, by Neltje Blanchan. He read the preface which told of the value of birds, and in a few days he said to me, "That sure was a good book. I never will kill another bird." I think he has kept his promise.

We as Nature lovers can save the birds. Let's do it!

*A Conservation Article
by a Young Conservationist*

EDGAR KINCAID, JR.

less collection soon to be discarded.

Those who live in the city will not believe that such a terrible slaughter goes on but nevertheless it is true. The Audubon Society is doing a great work but the task of saving the birds is too vast for the Society alone. It needs help.

Many of our birds are on the decrease simply because the Nature lovers have not been working as they should. If we could get the boys to stop killing the birds, I believe the birds would start increasing again in spite of the cats.

It is impossible for birds to keep on decreasing long without becoming extinct. If the birds become extinct, it is doubtful whether man himself could long survive.

How can we prevent boys from killing birds? The best way is for the parents in the home to teach their own boy, from the time he is small until he is grown, that he must never kill a bird, and give reasons. When the boy is out of school, for play, get him interested in some game or something else besides going bird hunting. A good baseball game or a good football game will do much to keep boys out of mischief. Then it is a good plan to make talks, wherever possible, to children, giving them good reasons why they should not kill birds, such as the fact that they are valuable in checking the increase of insect pests.

Now for a word of encouragement! Because of the Boy Scouts, boys are not quite so bad as they used to be, but because of many

THE VALUE OF TEACHING CONSERVATION

By ELLSWORTH D. LUMLEY

UNTIL recently the conservation of our wild animal life was a phase of biology seldom taught in the schools. No need was felt for offering such work, for we numbered the beasts of the fields and the fowls of the air as countless. We failed to heed the warning of the few far-sighted individuals who clearly saw that we were killing more than the increase.

Now that a crisis has been reached, we are doing a little sober thinking and are attempting by devious ways to mend the damage. Because of ignorance, propaganda and prejudices, many mistakes are being made. In fact so many mistakes are being made that some conservationists feel that real conservation cannot be practiced until the youth of the nation are educated in this field.

Attempts are now being made to offer either distinct conservation courses in our schools or to incorporate conservation work in such classes as Nature Study and Biology. The organization of the Educational Conservation Society will undoubtedly influence the introduction of conservation courses in primary schools, secondary schools and colleges. The Emergency Conservation Committee, through its pamphlets and teaching units, has influenced many biology teachers to incorporate conservation work in their classes. The National Association of Audubon Societies is now doing effective work in conservation through Nature Study classes and bird clubs. The Department of Conservation in NATURE MAGAZINE is an inspiration to all teachers who have an interest in the saving of our natural resources, and the American Nature Association is working on an educational program including conservation. Conservationists are devoting a great share of their energy towards the education of youth. This program, while coming too late to save some of our wildlife, will bear rich fruits in the future.

Children and young people are naturally observant. They see much that escapes older eyes. They are interested in what they see, and, if given the opportunity, will ask dozens of questions regarding their observations. In the past they have lacked efficient and truthful teachers to interpret the meaning of what they saw. The young people were dependent to a great extent upon superstitions, propaganda and falsehoods to explain the living world about them. The result is, therefore, that thousands of adults today are firm believers of such things as: all hawks are "chicken hawks" and should be killed on sight; owls are mysterious birds that fly about during the night feeding upon game and song birds; the use of the pole trap is a legitimate way of catching hawks and

Mr. Lumley is the head of the Biology Department of the Great Falls, Montana, High School and a pioneer in the field of making his biology classes contribute to a knowledge of the importance of wildlife conservation. He has made a significant contribution to conservation literature through his Teaching Units done for the Emergency Conservation Committee and valuable for school curricula.

owls; blue herons, kingfishers, white pelicans and all fish eating birds are a menace to the sport of fishing and should be killed at every opportunity; bounties on predators is a method of saving our wildlife; our shortage of waterfowl is due to crows, drought, drainage and the meddling of sentimentalists, not to overshooting. These and a multitude of other falsehoods are not only believed today, but are preached and spread through sporting magazines, pseudo-conservation societies and state fish and game commissions. And here lies a tragedy. Many of the men that today control the future of wildlife, by being members of game commissions, not only believe and preach these falsehoods but have the power to put them into practice. Witness the campaign upon hawks and owls with the use of the pole trap, conducted by the game commission of North Dakota. Note the opening of the season on all grouse in Montana this last fall on the excuse that the birds were inbreeding. Recall the bounty that has been paid for goshawks for several years in Pennsylvania. The educational task of conservationists is doubly hard when our young people see such examples of game management being practiced by supposed authorities.

Not until our young people are taught truths, and see the men in charge of wildlife practice the results obtained from scientific research, can we hope to save many of our wild mammals and birds.

The fact that our wildlife has steadily and rapidly declined even though millions of people have taken Nature Study courses and have belonged to bird clubs, rather conclusively proves that the old type of conservation teaching was ineffective. It was based too much upon sentiment and failed to cause the learners to think. Thus it failed to influence their behavior. To talk about the pretty birds, to learn about their home life, their beautiful nests and their handsome eggs made an appeal to the sympathetic and sensitive child, but too seldom did it scratch the skin of the ordinary student. Facts were learned, but these facts had no direct bearing upon the child's future actions.

The high school biology laboratory of the past was often nothing but a morgue and the biology course too often confined itself to the study of dead specimens instead of a study of "life" as the name biology implies. After being exposed to such a course the learners may have known for a short time the external and internal structures of various members of the animal kingdom, but they seldom had an appreciation of the close relationship

that exists between man and the creatures with whom he shares this earth. Lacking a knowledge of this relationship, men have failed to see how dependent the human race is upon a balance of Nature.

Education is no longer the process of pouring countless facts into the heads of the learners. Education today is concerned with the individual's ability to use facts. The building of citizens with the ability not only to fit their environment but also to improve their environment is one of the major problems of our schools. Closely coupled with this is the problem of educating youths and adults to the wise use of leisure time. Work in conservation fits admirably into such an educational program.

One of the aims of education is so to influence the learner that his future behavior is such that he may better profit by the things he has learned. Instruction in conservation accomplishes this. Pupils are not given hypothetical problems to solve, but are confronted with the existing problems that are puzzling many adults. Facts are sought and weighed and then judgments are made. Most students clearly see that conservation can only be accomplished through thoughtful study and not through more killing. With this realization, more logical solutions to existing problems are made. And since the stu-

dents have carefully thought their way through present day difficulties and have formed their own judgments they will govern their future actions accordingly. They haven't been told what to do or what not to do, but have formed their own opinions, which most often guide their behavior.

Among the possible contributions of conservation instruction are: an understanding and appreciation of the environment; an understanding of the relationship that exists between man and other animals; a better understanding of cause and effect; the development of a more scientific attitude; a greater ability to separate facts from propaganda; a recognition of some of the leading authorities in game management and conservation.

The education of our youth in conservation is a challenge to all ornithological societies, as well as to conservation organizations. The youth of the nation must be given the opportunity of learning truths and of understanding the relationship which exists between the lower animals and man. It is only through education that we can hope to bring under control many of the abuses now practiced against the wild animals. Education, of a character that will consider the relation of wild life to all of us, will mean the salvation of many vanishing forms.

WITH FAINT PRAISE

FISH AND GAME—NOW OR NEVER, by Harry B. Hawes.

D. Appleton-Century Company, New York, 332 pages, 1935. \$3.00.

We note, with mingled joy and sorrow, on perusing *Bird-Lore*, the organ of the National Association of Audubon Societies, for November-December, and *Natural History*, the Journal of the American Museum, for December, that it is unnecessary for us to review this book. We had already examined the work with some care, and were unable to decide what was its reason for being; we suspected, from the tone of its introduction, that it was projected as a treatise on conservation. We had intended to tackle, ourselves, the job of reviewing it, but this disagreeable duty is now lifted from our shoulders. Against this gain—or loss—we must attempt to balance the joy that comes from having escaped helping to advertise a book that the world would be better without, and the chagrin of having failed in our duty. It remains only to endorse in nearly every particular the careful analyses that William Vogt and H. E. Anthony have recorded. We say "nearly"—for we would not wish our readers to spend money, time or energy in order to wade through this mass of poor logic, misinformation (the author is least unhappy in his treatment of the fishes), ancient and overworked anecdotes, and ill-judged criticisms of "sentimentalists", under which title the author seems to include every one who for any reason objects to the extermination of our wild life that is now in rapid progress. Rather, we would advise our members to read these reviews, which we hope will be widely circulated, and spend the rest of the money on a good book, or a toy, and give it to some poor child.—E. A. P.

FOR ISLE ROYALE

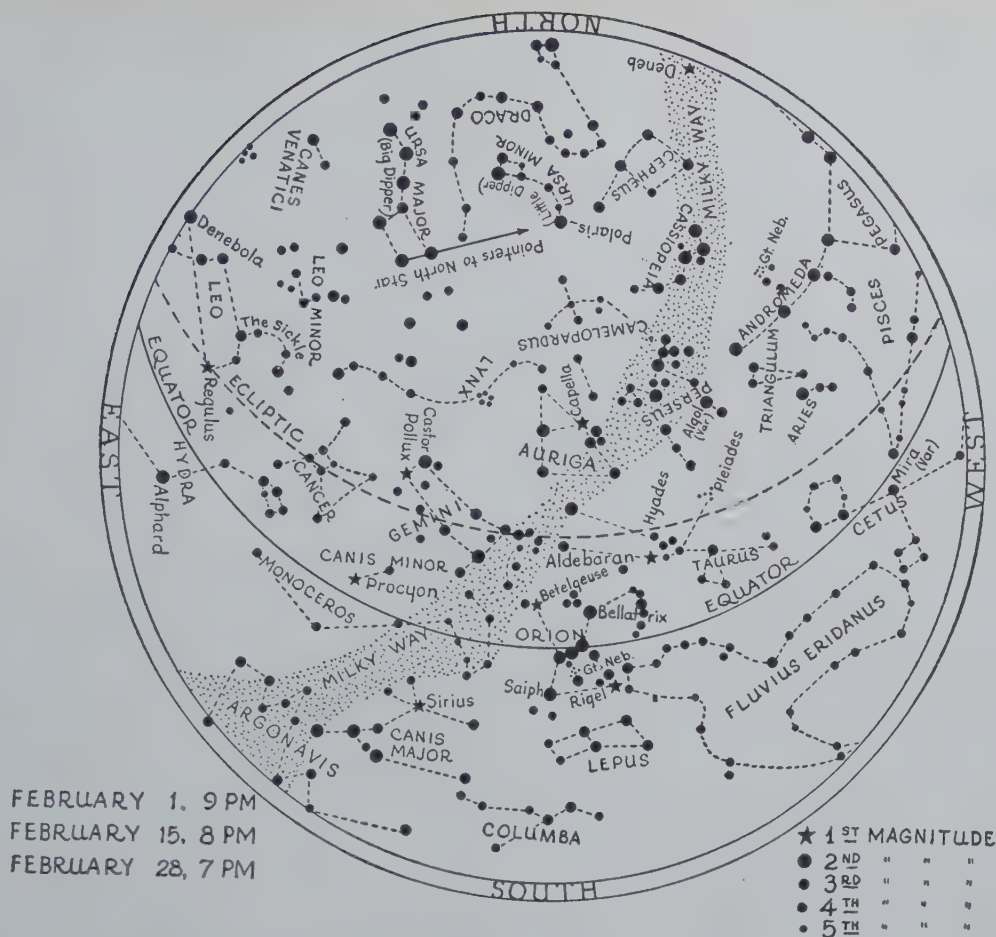
Announcement has been made by the Department of the Interior that \$705,000 has been made available for the acquisition of 121,000 acres of private land on Isle Royale for emergency conservation work purposes. This is another step toward the eventual creation of this island as a National Park, which is dependent upon the acquisition and transfer to the Federal Government of all the land involved in the project. (See *Nature Magazine*, Sept., 1935, Page 176.)

TO PRESERVE AREAS

Pointing out that "the geographic features of the American continents are characterized by many features representing inanimate and animate aspects of Nature which are characteristic of these regions and not represented elsewhere," the Second General Assembly of the Pan American Institute of Geography and History went on record for cooperative action on the part of the several American nations to select and preserve unimpaired such areas. A committee of not less than five members of the Assembly will be appointed to study the question and aid this program.

LAWS AID FORESTS

A survey of recent forest legislation made by the Forest Service shows that nine states enacted laws authorizing Federal acquisition of land for National Forests, four extended the scope of previous laws and many others passed laws beneficial to conservation of forest resources.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

The Discovered Planets

Far distant worlds that are rarely seen
 By ISABEL M. LEWIS

FIVE of the nine planets of the solar system have been known to man from the most remote ages. They are well-known to all of us. One of them, Mercury, is, to be sure, so close to the sun that it is never seen except in the morning or evening twilight. Yet when seen under favorable circumstances it shines through the haze of twilight surprisingly bright and beautiful, reminding us of the magnificent Vega, one of the finest gems of the northern sky. Venus, the twin of our planet Earth in size, far outshines all other planets. Its glory as Morning or Evening Star is never surpassed. Jupiter, the giant of the solar system, is, next to Venus, the finest and, usually, most brilliant of all the planets. It rivals, and at times surpasses, Sirius, most resplendent of all the stars, in brightness.

On rare occasions Mars, at its nearest possible approach to the earth, is more brilliant than Jupiter but, on the other hand, when it is in the part of its orbit farthest from the earth it is no brighter than a star of the second magnitude. Saturn, like Mercury, is about

equal to Vega in brightness when seen at its best, and is never less brilliant than a star of first magnitude. A sixth planet is our own planet, Earth, which if viewed from its twin planet, Venus, would appear to be the most magnificent planet in the heavens. But, at the distance of the farthest known planet, it would be lost to view completely in the rays of the sun and would, moreover, be such a faint telescopic object that, even if not hidden in the sun's rays, it could not be seen without the aid of a powerful telescope.

In addition to these six planets there remain three major planets of which we know little because they are at such enormous distances from the earth. They are the "discovered" planets Uranus, Neptune and Pluto, two of which can never be seen without the aid of a telescope. Like the earth and Venus, Uranus and Neptune are twins in size. The diameter of Uranus is about 31,000 miles, or nearly four times that of the earth, and that of Neptune is about 33,000 miles. Uranus also has four moons, the two largest more than a thousand miles

in diameter, while Neptune has one moon even greater than our own moon in size. The distance of Uranus from the sun is nineteen times that of our own planet and it takes about eighty-four years to complete one trip around the sun. Neptune's distance from the sun is about thirty times that of the earth, or nearly 2,800,000,000 miles, and it takes more than 164 years to complete its journey around the sun. Pluto, the little world which, it is believed, cannot exceed Mars in size, and may be as small as Mercury with its diameter of only 3000 miles, is now the most distant known planet, although it may be the nearest of a belt of small planets, such as the terrestrial group of which our earth is the largest planet, lying far beyond the orbit of Neptune. It is known that the gravitational attraction of the sun is great enough to control the motions of bodies at great distances beyond the orbit of Pluto, and for all we know to the contrary such bodies may exist.

The distance of Pluto from the sun varies greatly because its orbit is elliptical. When nearest to the sun it comes slightly inside the orbit of Neptune; when at its greatest distance from the sun it is about 4,600,000,000 miles away. The orbit of Pluto is also inclined at a high angle to that of the earth. In these two respects it differs much from the orbits of all the other planets, except that of Mercury, which is also quite flattened and inclined at a considerable angle to that of the earth and other planets. It seems strange that this little world, that appears to be very similar to the innermost planets Mercury, Venus, Earth, and Mars, in size and in density, should be out among the giant major planets, as they are called, Jupiter, Saturn, Uranus and Neptune. All of these have low density, about the same as that of water, with the exception of Saturn, which is so light that it would float in water. At the great distance of Pluto the sun would have no visible disk but would shine like an intensely brilliant arc light viewed at a distance of a few yards. Only the outer planets would be visible, for the terrestrial group would be far too faint and too near the sun to be seen, even in telescopes. The temperature of this frozen little world would be something like 380 degrees below zero Fahrenheit.

Uranus was discovered accidentally by Sir William Herschel on March 13, 1781, while sweeping the heavens with a seven-inch reflector he had made himself. He knew immediately that he had discovered a new planet because it showed an appreciable disk in the telescope and, moreover, its motion with respect to the fixed stars showed that it was a member of the solar system. Further observations were made of its position with respect to the stars, from which it was possible to compute its orbit and determine its future path through the heavens. Uranus is visible to the naked eye as a faint, sixth magnitude star if one knows exactly where

to look for it, but it is necessary to have a star chart to locate it.

It was not long after the discovery of Uranus before it was found that it was not keeping to the predicted path which it should follow if subject only to the attractions of the known planets. Two young mathematicians, Adams, an Englishman, and Leverrier, a Frenchman, worked on the problem and came to the same conclusion about the same time. The motion of Uranus was being disturbed by an undiscovered body and they predicted the approximate position in the heavens where the disturbing body would be found. Leverrier communicated his results to the astronomer Galle at the Berlin Observatory who fortunately had a new star map of the very region indicated. Within half an hour of the time when the search was begun the disturber was found less than twice the moon's diameter from the position indicated. The new world was named Neptune and was about equal to a star of the eighth magnitude in brightness. It could be seen easily in the smallest telescopes and showed a planetary disk of greenish color. This discovery of Neptune was made in September, 1846, sixty-five years after the discovery of Uranus.

The discovery of Pluto was in a way similar to that of Neptune. Percival Lowell, the founder of the Lowell Observatory and its first director, suspected from certain irregularities in the motion of Uranus that it was affected by still another unknown body and he worked for years on this same mathematical problem of locating the disturber by its action on the known planet. He called the body he sought Planet X and predicted approximately where it would be found. Some years later a systematic photographic search was begun at the Lowell Observatory for this body with the aid of a powerful telescope, and in January, 1930, it was found as a small star-like object on a photographic plate by C. W. Tombaugh, an assistant at the Lowell Observatory. This object was observed and photographed for seven weeks before the discovery of a trans-neptunian planet was announced to the world by telegram on March 13, 1930, the same day of the month on which Uranus was discovered and also the birthday anniversary of Percival Lowell, whose researches had eventually led to its discovery close to the indicated position.

Pluto can be seen only in large telescopes as it is of the fifteenth magnitude. It has been seen in both the 26-inch and 12-inch equatorials of the Naval Observatory, and many other large telescopes.

The planets Venus and Jupiter are visible in the eastern sky before sunrise this month. Mercury may be seen also in the eastern sky before sunrise the last week in February. Mars is low in the west in the evening twilight. Saturn is still in the western sky but too close to the sun to be seen.

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Trailside Treasures

THE HUNTERS MEET BUSHY

By JANE ADAMS PARKER

THE children fairly stumbled over one another as they scrambled into the store-room to see who the New Year's visitor could be.

"He must have flown in just before I shut up the window for cold weather," said Ben. "He's hanging over in the corner, above that pile of screens."

"That's about where we used to keep Fuzzy Wuzzy," said Jerry.

"Why, IT IS Fuzzy Wuzzy," shouted Jo.

"I've heard of tamed bats coming back to their old hibernating quarters," said Grandpa Arnold. "And this little fellow does certainly look like the one Jerry and Jo found hanging in the old trailside cabin, last winter."

"We've walked through that store-room ever so many times," said Rosy, "and never saw him. I guess we weren't using our 'Seeing Eye.'"

"Well, come on, Chickens," said Grandpa Arnold, "button up your wraps. Aunt Dot and I promised Jackie Knight we would bring you over to see him this afternoon."

"Who's Jackie Knight?" asked Jerry, all interest.

"He's a little boy, about your age," said Grandpa. "He lives down in the village. One day he didn't look both ways carefully enough before he ran across the street. He was hit by an auto. So now he has to sit in a wheel-chair for a long time before he will be able to run and play like other children."

"Ohoh," said Rosy, looking quite sad. "Let's

hurry! He must be lonesome sitting alone all day."

Jackie had been sitting by the window, watching for them. His pale face beamed as they all trooped in. In less than no time, they were all chattering together like old pals.

Of course the hunters had to tell him all about Treasure House, and the fun they had had tramping down the old trail, looking for treasures.

"We have ever so many things," said Jo, "moths and butterflies, and some cocoons that haven't come out yet."

"And a raccoon named Ricky, and a darling milk snake," added Rosy.

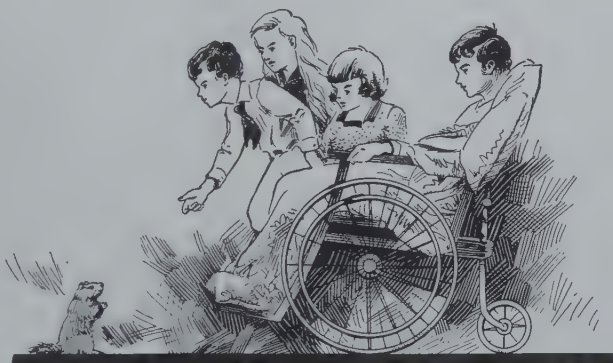
"Whew, I'd like to see them," said Jackie. "My uncle John sent me a pet he rescued from a hawk. But I haven't any place to keep him. Say, wouldn't you like him for your treasure house? Listen, that's Bushy

now, scratching to be let out of his cage."

Jackie's mother went into the back room. And when she came out again, there was a queer, clumsy little brownish-gray fellow about a foot long, walking along beside her on his short legs. He looked all around at the children a moment with his beady black eyes. Then he went over to Jackie's chair, and stood up on his hind legs, like a puppy begging for food.

How the children laughed, as they patted his queer flat head.

"He's a woodchuck," said Jackie. "He feeds on grasses and clover all summer until he gets so fat and sleepy that he curls into a ball, way back in



JERRY, JO AND ROSY MEET JACKIE KNIGHT AND HIS LITTLE PET, BUSHY

his burrow and sleeps until spring. Uncle John says he usually digs his hole in the side of a hilly place or in a woods pasture. And isn't it funny, he lives on his fat all winter, instead of storing up food the way squirrels do."

"He generally hurries into his hole, when anything gets after him," said Grandpa. "But if he can't, he puts up a brave fight. The Sioux Indians call him 'Hobcusha'. There are several kinds of marmots, for that's what Bushy is. There's the whistler, much larger than this one. He has grizzly-gray hair, with dark markings, and lives up north. Then there's another one down south with bright red hair underneath. Then up in the mountains

of western Washington, there's the one that's yellowish in summer and bluish-gray in winter. His worst enemies are the eagles and coyotes."

"And we'll be only too glad to drive over and take this one to our Treasure House, if you really wish us to," said Aunt Dot. "Anyway we'll come back real soon. Now it's getting dusk and we must start along."

"I've been thinking," said Aunt Dot, as they reached the walk, "and I believe I have a plan where we can let Jackie have some of the fun out of our treasure hunts too. We'll talk it over next meeting."

(To be continued.)



The Traveling Frog

By JESSIE M. HARRIS

OUR frog who looks so pert at the Polka Dot Hound was not always a frog as we see him now. First, he was a queer little wriggly thing called a tadpole swimming about in a dingy pool. There the boys found him and carried him home in a tin can to live in their fish pool.

At this time he looked more like a fish and lived in the bottom of the pool among the slimy weeds. He grew and grew, as all well-behaved tadpoles should. By and by two little hind legs appeared; then two forelegs began to grow; his tadpole tail

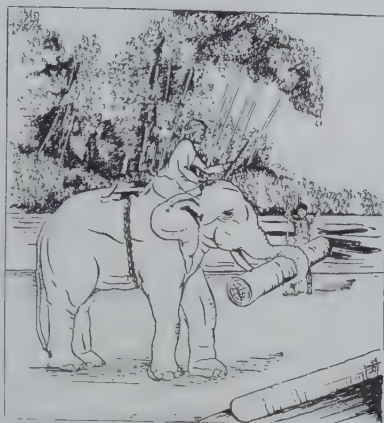
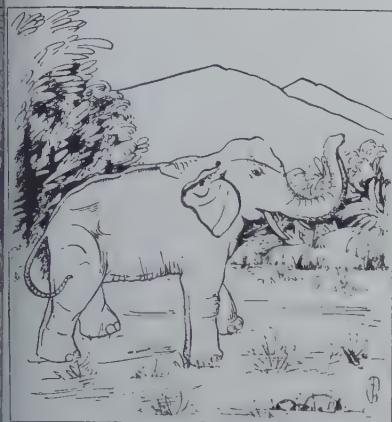
began to shrivel and shorten. About this time one of the goldfish in the pool nibbled one of the tadpole's hind legs. He always carried this injury and by it the boys were always able to recognize their frog.

During his first year he began his travels. Just where he went we do not always know. Various neighbors would report a frog at their pool and the boys would look it up and find it to be their frog.

The next year he did not travel so much but

stayed about the pool and garden. In September it rained and rained; the water came up so high it washed the goldfish and frog away. Now the boys were sure they would never see the frog again. But next spring a woman said there was a very, very big frog around her pool. He was very tame. The boys hurried over to see it. There he was with his lame hind leg. Soon he appeared at the home pool.

By this time he was two years old and a full-grown frog. He was quite the biggest frog the boys had ever seen, a real bullfrog. He looked fine in his olive-spotted green suit, and his bright green cap and white vest. However, he did not stay long. Perhaps he found another pool he liked better and some friends and a lily-pad to sit on and sing: "Chug, Ker-chug, Chug-a-run."



Elephant Secrets

By CLARENCE M. WEED

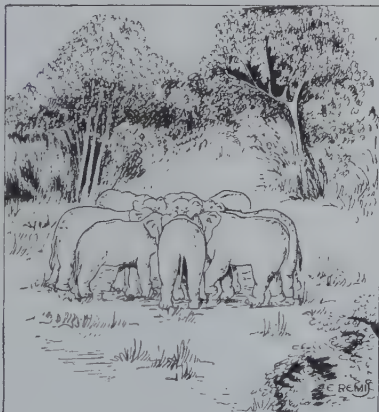
NO ONE who has ever seen an elephant forgets the sight. The largest of land animals, elephants are notable for their great bodies, their thick legs, their large ears, their ivory tusks, and the long trunk that serves so many different purposes. The two common species still found on the earth are the Indian elephant and the African elephant. The latter is much larger than the former. The Indian elephant inhabits many parts of Asia, and has long been used by man to perform various helpful tasks.

Indian elephants are useful in timber yards where they pick up and carry great logs and beams from place to place. It was once supposed that African elephants could not be tamed for such work. Recently this has been done with success. In both cases the wild animals, fully grown or nearly so, are captured and soon trained for the tasks to be done. Elephants imitate and learn some things readily. But they are not as intelligent as domestic dogs.

Many mysteries about elephants puzzle the wisest students. One is their ability to travel through their jungle homes so quietly that they

are not heard by men a few rods away. Another is their method of talking with one another. Perhaps this is no more mysterious than with many other animals that seem to be able to send ideas to one another in ways no man can understand. But with elephants it often seems more remarkable than with smaller creatures. Martin Johnson, famous African explorer, tells of an experience with elephants that suggested telepathy—the reading of minds without a word being spoken.

One day Mr. Johnson saw a herd coming toward him, led by a bull elephant. The leader became suspicious that something was wrong. The great beast lifted his trunk to test the air for the smell that denotes man. But the wind was in the wrong direction. The leader, however, was still suspicious. He stopped, turned around and brought the herd together head to head in a huddle. Here they stayed a few moments, then started off in another direction. What happened during the huddling moments? Mr. Johnson suggests they were considering the situation "telepathically". Who has a better guess?



Nature Magazine in School

A Department of Aid to the Teacher

Night is in the Pineland

Thoughts from this splendid article could be used to give younger children as an introduction to a field trip. Some of the older pupils could read it themselves and travel in imagination through the southern forest, seeing the interesting creatures and feeling the quiet and majesty of the woods at night.

Insect of Prey

Did you ever watch an ant lion as this author did? This most obliging little insect would be an interesting addition to the schoolroom terrarium. In setting up the terrarium care should be taken to collect some of the soil in which the ant lion larva was found so that he would feel at home. Food could be supplied by ants and other insects placed in this artificial domain. By observation the pupils could discover for themselves the habits of this little insect. Through his feeding habits they could also be getting a lesson on the interdependence of living creatures—the balance of Nature. They could read the article to check up on their observations.

Solving Seed Catalogue Puzzles

This is a pastime which is as delightful to children as to adults. If the school is planning to have a garden or if individual pupils will have gardens at home, it is fun to make the plans at school and in so doing to be led to investigate some of the problems pertaining to plants and soils. Pupils can bring in samples of soils to be examined to determine acidity, texture and humus content. The exposure of the garden should be considered—whether sunny or shady, sheltered or exposed to winds. The decision should be reached as to whether the garden will be planted with flowers, vegetables, or both, and plans should be drawn and exhibited.

Wooden Fingerprints

This would be a very interesting study for a biology class. It might even be undertaken to a limited extent by a junior high school class studying a unit dealing with forestry. As background the pupils would need to know something of the functions and structure of plant organs. Making slides of wood sections would be an instructive activity in which pupils would have the opportunity to discover the tubes through which water travels from the roots to the leaves of the tree and to find out why this year's annual ring is laid outside of the last in the sapwood and in the bark inside of the previous one, as well as the difference between the hardwoods and the softwoods.

In order that teachers and parents may further use Nature Magazine as an aid to the study of Nature and Science, this page is devoted to the following brief notes based upon articles in this issue and suggesting ways in which they may be used as a source of inspiration and information. To bring these Nature study thoughts to our readers we have obtained the services of one eminently qualified for the task, and this department is edited

BY ESTHER SCOTT

Instructor in charge of Elementary Science
Washington, D. C., Schools

Migratory Birds of Northwestern Alaska

The subject of bird migration is one of great interest to most pupils above the third grade. They want to know which birds fly the greatest distances, they like to trace the important routes traveled by birds, and they always ask why do birds migrate. This particular article gives a good idea not only of the species of birds to be found in Alaska but of the struggles that these birds undergo to live and raise their families. It could be used in a natural science unit dealing with the provision that animals make for their young, or in a social science unit dealing with the Eskimo.

Boys Are Killing Our Birds

This is undoubtedly true—often it is the city boys who come to the country, but those who have always lived where birds are more or less plentiful are sometimes guilty. The destruction of birds is something that parents and teachers together must work to overcome. The attitude of young persons toward wildlife can be changed at school but the schools could do much more with conservation if the home had given the right attitude toward it. In schools, science clubs that devote time to the study and protection of birds should be encouraged. Annual exhibitions of bird houses, feeding devices, notebooks made in the field, have been found helpful in promoting interest in bird study if the exhibition of these articles by the pupils is put entirely on a voluntary basis. Having occasional talks by someone interested in birds of the community, showing lantern slides or motion pictures, having talks by pupils and going on field trips are standard ways of conducting bird clubs. Since pupils are more responsive to the ideas of other pupils than they are to those of grown-ups, this club idea is a good way to break up the bad habit of testing marksmanship on birds.

The Discovered Planets

These are the distant planets, which only the astronomers know intimately. However, pupils like to talk about them, to draw charts of the solar system including them, or to

place them on a home-made planetarium. Some pupils enjoy writing about them, relating their adventures in imaginary visits to the distant planets. This article provides information which could be used as the foundation for these stories. The discussion of the accounts would provide the opportunity to distinguish between fact and fancy, to bring out the motions of the planets and their satellites, and to show that, because of the great distance from the sun, life as we know it could not exist. In addition this article gives timely information regarding the positions of the morning and evening "stars".

Trailside Treasures

How the children will enjoy these stories into which so much Nature lore has been woven. Teachers, too, will not only find information concerning the outdoors but valuable leads to children's interests. In this particular article the suggestions concerning two rather unusual pets are worthy of note. The bat is especially interesting to children and is in need of being better understood. Bats can be fed on bits of hamburger steak and any stray insects that can be provided. They even like a bit of ice cream now and then. It is important to provide them with plenty of drinking water. Even when they are hibernating a dish of water should be kept in the box with them to provide the proper humidity.

A comfortable resting place for the hibernation period can be easily made out of a cardboard packing box placed inside of a wooden one. The entrance should be secured with a wooden door as well as a cardboard one. The combination of the two boxes tends to keep the interior at an even temperature. On the back wall of the box just opposite the entrance a burlap curtain can be hung so that the bat can fasten himself there for his long rest. If the box is kept in a cool place, the bat will be able to hibernate and so survive the long fast. At any time he can be taken out by gently reaching a thumb and finger over the back, holding down the wings and keeping the fingers away from his mouth while gently unhooking his claws from the burlap. Bats soon become used to being handled and quite tame. One may be easily exhibited in a classroom by placing him in a large mayonnaise jar, over the top of which is a piece of wire mesh used for screens. The bat will fasten himself to the wire and appear to be quite contented.

The Public Domain

Our present senior and junior high school pupils will be voting before many years. It is therefore well to reemphasize the value of wise conservation, which is a real problem involving forestry, farming and government. In formulating a statement, information would have to be gathered from all of these fields. Perhaps some pupils could submit statements to those who have the responsibility for public lands administration

NATURE IN PRINT

As a convenience to readers the books reviewed in this department of *Nature Magazine* may be ordered through the book department of the American Nature Association.

Animals for Children

A Child's Story of the Animal World is what the title indicates, a zoology book written for youngsters at the inquisitive age. It is the work of Edward G. Huey, who has so worked out his scheme of treatment that the complicated story of the animal world has been presented in simple and dramatic fashion. The author has carefully tested his text with his own classes at the Calvert School in Baltimore as a means of determining its readability and appeal to the younger reader. It is a book that should find a place in many children's libraries as something fascinating to read, not as a school text but just for the drama it contains. It is published by Reynal and Hitchcock, is profusely illustrated and sells for \$3.50.

British Sea Birds

Frances Pitt, English ornithologist and writer, has the faculty of making her bird study expeditions read like romance and adventure. In fact, they are rich with adventure for anyone who loves birds. In her latest book she writes of the birds of the sea, coastal islands and cliffs at various points along the English coast. The book she titles *Birds and the Sea*, and her entertaining text is supplemented by splendid pictures taken with the author's own camera. The book is brought out in the United States by Longmans, Green and Company, and the price is \$2.50.

Water People

Water People is the title given by Wilfrid Swancourt Bronson to his latest juvenile Nature book. It is devoted to the strange and interesting inhabitants of the sea. Many of these creatures have been given names that relate them to our life on land, such as the sea anemone, the horseshoe crab, the sea cucumber, the jelly fish. And in his treatment Mr. Bronson has related these creatures to everyday life. For example, one chapter is entitled "A Submarine Sewing Circle" and deals with the needle fishes, thread fishes, sea thimbles, ribbon fishes and a number of other denizens of the deep whose popular names would place them in a marine sewing kit. It is a most entertaining and instructive book for the not too juvenile reader, and no small part of its charm lies in the fascinating colored illustrations, these also by Mr. Bronson. The publisher is the Wise-Parslow Company, New York, and the price is only one dollar.

Pacific Coast Trees

If anyone asks you to recommend a guide to the trees found along our West Coast, you can refer them without hesitation to *Pacific Coast Trees* by Howard E. McMinn and Evelyn Maino. This manual covers California, Oregon, Washington and British Columbia. The native trees and about four hundred introduced species come within the scope of the volume, which is illustrated with twenty-two photographs and 393 original drawings. An excellent key is a valuable part of the book, and H. W. Shepherd has supplied an appendix listing trees recommended for various uses on the Pacific Coast. Thus this volume has an added value beyond its main purpose of serving as an identification guide. It is brought out by the University of California Press at \$3.50.

Flower Garden Primer

We suppose that publishers know their business and that the army of gardeners must be limitless, but sometimes we wonder how this army can absorb all of the splendid garden books brought out. The latest addition to the gardener's library to come to hand is *Flower Garden Primer*, an excellent foundation volume for the beginner at gardening. It is the work of Julia H. Cummins and is a practical and valuable book. It contains, beside fine photographic illustration, diagrams and tables of distinctly useful character. It is published by Macmillan and sells for three dollars.

Forestry Outline

Forestry means more to innumerable more people today than it did a decade ago. Public education carried on by such organizations as the American Tree Association has contributed notably to this, and the more recent personal contact with forestry by an appreciable number of our younger citizens and their families through the C.C.C. has further spread the word of this science. Pertinent to this, then, is *An Outline of General Forestry* by J. S. Illick. The author in his preface says that his book "is designed primarily as a general introduction to forestry and other closely related branches of conservation. It is not intended as a complete textbook, nor as a research contribution, but rather as a guide to a general understanding of what forestry is, how it is developing, what it is doing, where it is heading, why it is needed, and what benefits it is bringing to mankind." Dr. Illick has eminently well achieved his purpose and given us a useful book. It is published by Barnes and Noble and is available in the paper edition at seventy-five cents a copy and in the cloth edition at \$1.50.

For Entomologists

Entomologists and insect students will be happy to have in their libraries *A Contribution to a Bibliography of the Described Immature Stages of North American Coleoptera* compiled by J. S. Wade of the Bureau of Entomology and Plant Quarantine. This compilation of references represents a tremendous task of research of published texts.



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Hiking and Camping Forum

Conducted by
ERNEST A. DENCH

Hiking and camping inquiries will be answered by mail if a stamped, addressed envelope is enclosed. Address the Forum editor.

Brevities

New England harbored a Youth Hostel experiment in 1935. A second chain will provide overnights in N. Y. and N. J.; third will extend to Pa. and Md.; fourth will swing inland to Ohio, Ind., Ill., Wis. and Mich. Answers to forty common Youth Hostel questions monopolize recent issue of *The Knapsack*, 10 cents from Monroe Smith, Northfield, Mass. . . . New Appalachian Trail club forecasted for Southern Virginia. . . . Regular rides of the Horse-Shoe Trail Club are occurring. Horses trucked home at end of each trip. Hiking clubs and individuals also use and help maintain this Pennsylvania trail of 139½ miles. And the last half-mile means much! Overnight cabins promised when finances permit. The five H-S T sections are traced on pasted-up U. S. topographic maps, \$1.25 for the set, from president Henry N. Woolman, 132 St. George's Rd., Ardmore, Pa. . . . Timely pedestrian pilgrimage to Frost Lake made by St. Paul Municipal Hiking Club. . . . A three-part group hike: *Ahead*, The Racers. *Midway*, The Plodders. *Tail-End*, Talkers and Yarn Spinners. . . . Philadelphia's boundary line will be girdled this winter on ten hikes, 5-9 miles each, by Nature Ramblers Hiking Club. . . . Thomas Dreier, New Hampshire advertising man and lover of Nature, extracts year-round enjoyment by living on a farm at the foot of the Ossipee Mountains. His homespun philosophy pervades the potpourri volume, *The Mountain Road* (Stratford Co., Boston, \$2.00). . . . 150 hikers from 22 local clubs at the recent get-together of the N. Y.-N. J. Trail Conference. Adirondack truck trails had only one ardent supporter—and a hiker at that. Ears of CCC boys burned that night! Altered status of the NYNJTC is that of an independent regional federation. . . . West-bound travelers take note: 25 different types of maps for Western states, Hawaii and Alaska procurable from Southern California Blue Print Co., 114½ W. 3rd St., Los Angeles. One is a blue print of Angeles National Forest. List on request. Another source: Large folding maps of Cascade and Olympic ranges are published by the Kroll Map Co., Seattle. . . . Prairie Club broke new ground on a week-end trip—Indiana's largest state park and game preserve, 15,000 acres. Weedpatch Hill, 1152 feet, is highest elevation. . . . Tennessee now has the Unaka Hiking Club, chiefly for the staff of the Takoma Hospital and Sanitarium, of which Dr. L. E. Coolidge is medical director.

Duties prevent staff going on a long mountain trip more than once a month, but local hikes are taken weekly. . . . Forum editor craves more knowledge of the "faint confusing" trail which the Carolina Mountain Club followed up Rough Butt Bald. . . . Class D membership in the Appalachian Trail Conference is now open to all interested in the A-T. First 1936 publication mailed to members is the enlarged and revised edition of the *Guide to the A-T in Maine*. Inquiries to the A-TC at 901 Union Trust Bldg., Washington, D. C. . . . Four years of mimeographed bulletins—and then a printed magazine with a professional air about it. Illustrated contents of particular interest to eastern hikers, campers and skiers. *The Intercollegiate Outing Club Journal*, edited by J. Reginald Springstead, is sponsored by the Middlebury (Vt.) College Outing Club, one of 25 such clubs affiliated with the IOAC. . . . Hats off to Mrs. Lane for developing, unaided, the Flat Top Trail, first of a projected side trail series—A-T "feeders"—for the Natural Bridge A-T Club, Lynchburg, Va. . . . When the Field and Forest Club (Boston) recently entered its 33rd year, president Franklin Balch indicated the F and F never suffered the pangs of infancy. "The calendar in 1906 was as comprehensive as any issued in 1935," said he. . . . Although the Red Triangle Outing Club dates back only to 1919, it is the oldest Washington (D. C.) group in point of continuous activity. H. B. George is the present president.

February Gadget List

1. *Camp cookery and picnic menu aids*: (a) Free booklet giving 200 different ways to serve rice. (b) Eight pages of a free book by a bread firm devoted to sandwiches and varied fillings. (c) Recipes and suggestions for outdoor meals in a prepared flour booklet, also gratis. (d) Recipe bulletin by a firm specializing in three "short-cut" flours—biscuit, cup cake and pie crust.
2. Patented ejector fork for preventing burned fingers during camp cooking operations.
3. Ski parka in water-repellent airplane cloth. Choice of 3 colors. Weighs 12 ozs.
4. A Canadian matchstick device for removing cooking odors in camp buildings and tents. Choice of 4 delicate aromas. This is *not* an incense.
5. Skiing instructions contained in free catalogs by two equipment firms.
6. Catalog of new and secondhand mountaineering and skiing books.
7. Granulated product for curbing rust and mildew, and for drying out wet shoes.
8. Campfire kindling device which can be used over and over again by re-soaking wick. Speeds cooking operations in wet weather. Uses kerosene, gasoline or alcohol, but fuel need not be carried if wick is soaked beforehand.

Further details of above items promptly mailed if a stamped addressed envelope accompanies your request.

St. Louis Now Trail-Conscious

Last November the Forum focussed attention on the neglect of the Ozarks from an organized hiking standpoint. By the long arm of coincidence a sub-committee of the St. Louis Community Council now projects

a 45-mile trail in St. Louis and Jefferson Counties. Rest houses, patterned after Youth Hostels, will be stationed 15 miles apart. Local farmers will act as wardens.

Mr. Paul D. Kelleter, who is U. S. Forests Supervisor for the 3⅓ million acres to be acquired and developed in the Ozarks, has offered to develop Ozark trails when this Walk-Ways committee is ready for them. As the *St. Louis Globe-Democrat* predicts: "We may yet see Ozark ridges laced with such trails."

Fast Cooking on Winter Trips

A group meal requires a *small* separate fire for each four people. Use dry wood, but not too much of it. Meat can be cooked and coffee made by experienced campers during the midday luncheon hour; all others will need 1½ hours.

A quick cooking fire which serves W. W. Cady when pressed for time is to place the food where it gets the heat—and not the flame and soot from the blaze. This limited heat zone lies just to windward of the ascending flame column. Conduct cooking at right angles to radiation lines.

Again you need a small fire, with wood from 5 to 8 inches long, and ¾ to 1½ inches thick. Use only five sticks at a time during the heat producing stage. Lay sticks with one end on something in the fire so that air will be underneath most of the time. Commence cooking when starting blaze is over, adding only one or two sticks shortly before fire commences to die.

Fuel of the size designated usually takes about two minutes to develop heat. Operation is completed in about seven minutes. Times are approximate, as hard woods are slower to ignite and last longer; while soft woods burn speedily. The knack of this fire is careful attention and fast work.

The cook who must have his good bed of coals to work with can develop them in 20 minutes with this type of fire. At the start put on more wood of the same dimensions as given heretofore.

Allentown, Two-Club City

The official who drafted the Allentown (Pa.) Hiking Club's by-laws in 1931 was gifted with imagination: ". . . to escape the crowded city; to walk, hike and climb for enjoyment and exercise with Nature-loving companions. . . ."

In 1934 the AHC took over seven miles of Appalachian Trail maintenance from the Blue Mountain Eagle Climbing Club. In 1935 the AHC built an Adirondack type lean-to for campers using the A-T here.

President John Liebig is now conducting a weekly hiking column in the *Allentown Morning Call*. Although the column is primarily an AHC publicity medium, equal space is accorded the schedule of the Community Hiking Club, which specializes in Saturday afternoon trips. This is a friendly gesture to a club neighbor. Column is open to all clubs within a 100-mile radius. Since fall the AHC Sunday hikes have covered, at fortnightly intervals, all sections of the A-T approachable on a one-day outing.

Irene Welty and Rose Perri are, respectively, treasurer and secretary of the AHC.

(Continued on page 124)



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last word on this problem. His book is de-
signed for officials concerned with the care
of these shade trees and for home owners
and others interested in their preservation. It
is published by the Comstock Publishing
Company and sells for five dollars.

Trillium Find

A white trillium that is a white trillium
was found by a party of Nature lovers of
which Aulden D. Coble of Chicago was a
member. The spot was in a canyon border-
ing Starved Rock State Park, Illinois. A
group of thirty-seven trilliums was discov-
ered but one was clinging to the side of a
large boulder over which a layer of moss
and earth had formed. This specimen had
three separate stems with a blossom and
three leaves on each. The stems measured
twenty-seven inches from base to tip; the
blossoms about five and one quarter inches
across. The party admired this find and left
it with the silent hope that those who might
later come that way would be equally wise.

Morning Glory Seed

We have received a letter from Mr. S.
Suzuki, secretary of the Akatsuki Asagao
Kai, 10 Sentaicho, Sumiyoshi-ku, Osaka,
Japan, which is the Morning Glory Society,
corresponding, we gather, to our own Rose
Society, Dahlia Society and others. Mr.
Suzuki writes, with some sadness, that his
society has received complaints that seeds
of morning glories purporting to have origi-
nated from the crop of the society have
turned out badly. He is doubly grieved be-
cause none of these seed have been sold to
any dealer in seeds and must have been
misrepresented to the purchaser. He further
wants to trace the source of these seeds
supposed to have originated with his group.
Mr. Suzuki adds that the society is plan-
ning to open to the public the names and
descriptions of all varieties grown by its
members with a view to wider dissemination
of surplus seed. A booklet giving cultural
directions and descriptions is being trans-
lated into English. Morning glory enthu-
siasts and any persons knowing about the
misrepresented seeds are urged to get in
touch with Mr. Suzuki at the address given
in the first sentence of this note.

Poetry Contest

In connection with the fiftieth anni-
versary of the gift of the Statue of Liberty
to the United States by France, the National
Life Conservation Society has announced
three prize awards for appropriate poetry.
Full details may be obtained from the So-
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Hiking and Camping Forum

(Continued from page 122)

Spring in the Desert

"I have two weeks to squander in the west early next spring," writes an eastern reader. "Can you suggest a good hiking trip in a snowless region?"

Yes, try the Mt. San Jacinto to Mexico sector of the Desert Crest Trail. Wild flowers and desert views will be at their best, while the trail passes through many Indian reservations. It links four state parks, all of which, in restricted areas, have camp grounds and related recreational developments.

The only place where snow should be encountered is on Mt. San Jacinto, 10,805 feet. The summit has a comfortable hut for an overnight stay—and the sunrise and sunset views over the Imperial Valley, 10,500 feet beneath. If advisable, this major peak can be omitted. To the south are semi-desert mountains—little more than rolling hills, interspersed with valleys.

To do this trip in comfort, with time off for sightseeing en route, a daily average of ten miles is recommended. Since last June most of the trail has been relocated to enhance its wilderness values.

The Pacific Crest Trail System is summarized in a booklet, 20 cents from Clinton C. Clarke, 125 S. Grand Ave., Pasadena, Cal. A large trail map will appear early in 1936.

The new administrative set-up of the Pacific Crest Trail System Conference includes an Executive Committee of six, headed by Clinton C. Clarke. Duties will be departmentized. In charge of the trail in their respective districts will be the five District Committees, self-organizing and governing bodies. Ten Advisors—National Park and Forest executives—will work in co-ordination with the two committees. PCTSC member organizations at present number nine.

More About the Ouachitas

There is a hiker in Arkansas who hardly knows whether to feel sad or glad over recent Forum recognition of the Ouachitas. He writes: "My pleasure from your mere mention of my beloved mountain country is almost as great as my grief from your piracy of the mountain. Except locally, the region is little recognized."

The Forum editor committed a boner in crediting Oklahoma with Magazine Mountain. Correct locale of this 2800-foot peak is western Logan County, Arkansas, about 55 miles east of the Oklahoma state line. It is to be developed into a large state park, and can be reached by highways 7-10.

Professor Daniel O. Todd of Ouachita College (Arkadelphia, Ark.) is intimately acquainted with the Ouachitas, and volunteers his services to any club desiring to conduct a trip here. During the school year Professor Todd often takes friends on week-

end camping expeditions to selected places.

The Ouachitas are intensively developed in the vicinity of Hot Springs, where there is a national park of 946 acres. The three mountains are girdled with 18 miles of easy-going graded trails and 12 miles of roads. Available literature: *Horseback and Hiking Trails* (10 cents. Chamber of Commerce, Hot Springs, Ark.). *Hot Springs National Park* (Free. National Park Service, Washington, D. C.). *Hot Springs National Park Topographic Map* (10 cents. U. S. Geological Survey, Washington). *The Ozark and Ouachita Mountain Regions* (Free. Conoco Travel Bureau, Denver, Col.).

Compared with the 967,527 acres of the Ouachita National Forest, the Hot Springs National Park is of microscopic size.

The Oklahoma Ouachitas include the Kiamichi Mountains in McCurtain County. The range is rarely in the spotlight because it forms part of the original Indian territory of the Choctaws. Main Choctaw industry is lumbering, with farming a close second. One tree makes three to four railroad ties at 20 to 40 cents each—a rate conducive to wasteful cutting of these beautiful forests. It is one reason why the Federal government has purchased so much of the land.

The Forum gratefully acknowledges the helpful information contributed by Inez H. Whitfield, Ruth Bowers, Stella S. Rhodes and others.

On Mount Kenya

Vivienne De Watteville, amateur photographer, gained special permission to "shoot" elephants on the Kenya Colony-Tanganyika Territory borders. Before long she borrowed a mountaineering outfit from Nairobi friends. No wonder; the lady's equatorial base camp was within sight of Kilimanjaro, 19,318 feet, and Mount Kenya, 17,040 feet. She moves up to the hut on Mount Kenya at 10,000 feet elevation. Side trips make the two months' stay pass quickly, and near the end she has a close call with a furious forest fire. The lady's adventurous narrative is within the covers of *Speak to the Earth* (Harrison Smith and Robert Haas, Inc., \$3.00).

Ever Tried Rhode Island?

We regard J. Earle Bacon as an authority on Rhode Island hiking trails. With characteristic modesty, coupled with a sense of humor, Bacon acknowledges the distinction "only because marked trails have heretofore been practically non-existent in our little state."

South County is noted for its semi-wilderness environment. It is possible to canoe for miles, or look from the top of one of R. I.'s small but sightly hills, without seeing a single habitation.

The summer camp of the Narragansett chapter of the Appalachian Mountain Club is superbly located at Worden's Pond, the state's largest natural lake. At different times about 25 miles of privately-owned bridle trails have been made. They are available for the use of properly accredited hikers.

The AMC is responsible for the reopening of a section of the old Indian, or "Dugaway," trail. Worn down by the moccasined feet of the aborigines, Nature had its chance to erode. In places the trail is now a ditch with banks from 10 to 12

feet high. Recently the AMC completed trail of over 20 miles from Narragansett Lodge to Green Fall River, just over the Connecticut line. Connecticut groups, chief of which is the Connecticut Forest and Park Association, are extending the trail to Lantern Hill, near North Stonington. The scenic highlight of the trail is the gorge of the Green Fall River. It is, in spots, nearly 100 feet deep, well forested with hemlock and white pine.

All AMC Rhode Island trails are designated by a reddish-orange painted symbol of an arrow topping a hollow circle.

Night Adventure on Chocorua

The Appalachian Mountain Club is as high in the estimation of Eleanor Early, author of *Behold the White Mountains*, and who confesses she is no hiker or camper. Drugged by the glorious sunset on a "chaise longue" near Chocorua's summit, Miss Early found herself trapped by darkness and those double trouble-makers—rain and wind. Her equipment was non-existent.

After a while along came a rescuer, but allow Miss Early to relate the happy ending: "Now, I am not an Appalachian, but I can see their good points. The man who found me was a hut master and full of tricks. He made a fire, and a shelter of evergreen boughs (the kind that don't prick). His pockets were lined with raisins, and he knew the way to a cabin where there was coffee and a pot to boil it in."

Consider the Next Campers

Use of open camps or lean-tos in national and state forests and parks entails certain obligations. Bedding boughs should be left for the next comers, and not as fuel. The interior, when used as a dining room, harbors mice and other rodents. During bad weather eat at the front edge of shelter. The crumbs which fall to the ground can be swept before vacating. At all other times dine outside.

Adapted from a long, informative article by A. T. Shorey in *High Spots* (Adirondack Mountain Club).

A Heavyweight Yarn

In all seriousness, the Scottish Development Council magazine gives a cure for mileage fatigue. Simply haul, with your bare hands, a large boulder for a quarter of a mile. So intense is the relief from the load that you can undertake more miles without effort.

If the hiker is already exhausted, how can he manage the required short distance with a back-breaking load? Explain that, S. D. C. The relief part we can readily understand. Have we not trudged up the heights with essential poundage on our back? Many a time have we parked the heavy pack at the entrance of a side trail leading to a spring. We felt so light on our feet from the new-born freedom that had a strong wind coming along at that time, we might have accompanied the dandelion clocks in their flight.

Nothing would please us more than to see the old Scottish shepherd perform his anti-tired act in the Highlands.

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Nature Movies

Now and then we have recommended Nature motion pictures shown in the commercial theater and have frequently wished that there were more worthwhile and authentic pictures of this sort shown. Noting audience reaction to the Nature motion picture—usually a short subject—it is plain that it has an unequalled appeal. Yet many pictures in this field have been distorted as to truth, inaccurate or otherwise undesirable. Yet there is as much drama in the world of Nature as there is in our human world. Furthermore it has been and can be recorded on the motion picture film.

A new series of Nature shorts, however, has just been released through the RKO Distributing Corporation under the group title of "The Struggle to Live." These films were produced by the Van Beuren Corporation in association with H. L. and Stacy R. Woodard. The first in the series is titled "Neptune's Mysteries" and deals with the drama of life among snails and octopuses. This is followed by "Hermits of Crab Land," and the third is called "Beach Masters," dealing with the life of the seals of the Bering Sea. The remaining three subjects are in process of production. We suggest that our readers ask the manager of their local theater to arrange for the showing of these shorts. In the larger cities they will undoubtedly be shown in the RKO theaters, and your theater manager can advise you when they are scheduled. These pictures fall in the "four-star" Nature class and are distinctly worth seeing.

Zion Park Birds

Clifford C. Presnall, park naturalist of Zion National Park, has made a helpful contribution to bird literature in an article, *The Birds of Zion National Park*, first published in the Proceedings of the Utah Academy of Sciences, Arts and Letters and now available as a reprint. In making this first compilation of the avifauna of this Park, Mr. Presnall has sought to satisfy both the scientific and popular interest. For the ornithologist, of course, the listing will serve merely to intrigue his interest and stimulate a desire for further study; for the average bird lover, however, the listing will serve to indicate what he may expect to find in the way of bird life in the Park. There are 140 birds known to occur in the 148 square miles of the Park area.

African Wild Life

The American Committee for International Wild Life Protection, Cambridge, Massachusetts, has issued Special Publication No. 6, *The London Convention for the Protection of African Fauna and Flora*. The purpose of this convention, which was held in London, November 8, 1933, was to consider methods of protecting the more important types of African Fauna and Flora that are in danger of extinction or permanent injury. The parties to the Convention are the Government of the Union of South Africa, the United Kingdom of Great Britain and Northern Ireland, Egypt, Spain, France, Italy, Portugal and the Anglo-Egyptian Sudan, and each country appointed Plenipotentiaries, who signed the Conven-

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tion and the Protocol, providing for further conferences and discussions. Dr. John C. Phillips, Chairman of the American Executive Committee, International Wild Life Protection, attended the convention as an observer in behalf of the United States, by invitation. The Netherlands and India were similarly represented.

The principal purposes covered by the nineteen articles of the convention concern efforts to be attempted in behalf of the endangered species, and include the establishment of National Parks, strict natural reserves, and reserves for particular species, and miscellaneous measures for the protection, in varying degrees, of all kinds of animal life. The means to be employed include regulation of hunting, methods of capture, use of motor vehicles and aircraft, poisons or poisoned weapons, dazzling lights, nets, pits, traps, snares and set guns, and such control of all white or native settlements as will insure as little disturbance as possible of the natural fauna and flora.

An "annex" to the report furnishes short accounts of more than forty species of African mammals and birds that are considered in special need of protection, and a map of Africa showing all National Parks and reserves for wild life as of June, 1935.

Bird Leaflets

Drawing upon the outstanding abilities of Roger Tory Peterson, the National Association of Audubon Societies are revising and bringing out new bird leaflets. The text is being changed to accord more closely with present-day teaching methods, and material is being directed both to the teacher and the pupil. Full information may be obtained from the headquarters of the Societies, 1775 Broadway, New York City.

Pennsylvania Club

We have just received and read with interest our first copy of *The Chester County Naturalist*, mimeographed publication of the Chester County Natural History Society of Coatesville, Pa. We receive a number of these club publications and systematically go through them so that we almost feel as though we knew personally those most active in the various groups. Nature lovers in Chester County, Pennsylvania, should get in touch with Howard L. Pyle, 131 Chester Avenue, Coatesville.

A Success Story By Ethel Severson

We have often heard of screen-struck youngsters haunting the gates of Hollywood studios, but it was something new under the California sun when, with a whirl of wings, a fluff of feathers took up his abode in a tree beside the main door of one of the large sound stages at a major studio. He could teach the aspirants at the casting office gates a lesson; he not only gained entry to the lot but he took up residence there. He brought his wife and built a home, a mere knot of a house on the branch of the tree. Then, on the chance that he might not impress the powers-that-be on his own merits, he proceeded to raise a family. Parents with screen ambitions for their offspring are not limited to the genus *Homo*.



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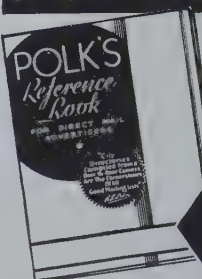
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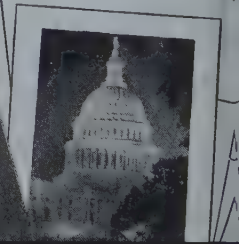
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Father Hummingbird hung in the air, a blur of wings, a fluff of ecstasy, in the brilliant sunshine of the California morning. In the vernacular of the screen—he had caught on—he had arrived!

Three Butterflies

By John Warren Johnson

The hike had been a long one. For eight hours my companion and I had climbed upward, passing from the desert, sun-burned lower ridges to the pinyon and lodgepole-covered crest of the Panamints. At last, having struggled up more than seven thousand feet, we reached the topmost pinnacle of the range—Telescope Peak, 11,045 feet high. We rested in the shade of a lodgepole pine, melted snow to fill our canteens and ate our lunches. Then we perched ourselves on the rock cairn at the very summit to view the fine panorama of Death Valley and the Mohave Desert, which lie to the east and west of the rugged range.

But we were not alone on the peak. Here on this barren, rock knob that penetrates the electric blue desert sky, amidst the snow drifts, were several butterflies. They flitted about in the strong wind that rushes up the west slope of the peak. Their shadows were more easily traced than the flight of the insects themselves. They seemed tireless. Minute after minute they sported about the peak, chasing each other, making swift darts, then rising in tangles of wings straight aloft, only to break free and dive towards the rock surface with impetuous daring.

I anxiously awaited their settling to rest on the rock. At last one hovered close to the ground, then alighted, spreading its wings and basking in the alpine sunlight. It was the west coast lady, *Vanessa carye*. Its orange-and-black-marked wings, tattered from a life amidst rough surroundings, caused a new warmth in my veins. I greeted it as an old friend. It had been my companion since boyhood.

Soon my attention was attracted to a larger, more angular-winged insect resting in the shelter of a rocky depression. It, too, held its faded worn wings tilted outward to catch the brilliant rays of the sun. It was our painted lady, *Vanessa cardui*, the most cosmopolitan of our Vanessas. It paused only a moment, then flitted away to play with its fellows.

The butterflies continued their game of tag. At last another alighted near me. A real surprise! It was neither *cardui* nor *carye*, but the lovely thistle butterfly, *Vanessa virginiensis*. As it slowly lifted and



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lowered its wings, I could see the large distinctive eye-like circles of the under surfaces of the hind wings. It was almost a new acquaintance. Few times have I met this dainty insect in our state. For us it is a rarity. I watched it as it absorbed the life-giving sunshine. Its wings, too, were worn by the hardships of this desolate environment. But defying its weakened wings, it soon flicked itself upward to re-enter the jousts of the butterfly tournament.

To me it was an interesting distribution record. On this high peak, isolated by hundreds of miles of bleak, sun-baked desert from all other temperate environments, were all three species of the orange-and-black Vanessas. Here, where snow lies six months of the year, and the climate would seem too severely alpine, flitted the west coast lady, a resident of mild western coastal climates, in company with the thistle butterfly, which is found in greatest numbers in the more rigorous climates of the eastern states. This was a meeting place of the distribution zones of the two butterflies. Here both of them, which were typical of the opposite sides of the continent, lived together in an area of a few square miles. And completing this distribution picture, with them the hardy painted lady, the true cosmopolite, basked and played.

About Grand Canyon

History and exploration in the Grand Canyon of the Colorado is the subject of the second natural history bulletin brought out by the Grand Canyon Natural History Association. It is of special interest to anyone who has visited this glorious region. Single copies of the Bulletin cost fifteen cents and may be obtained from the Association at Grand Canyon National Park. Membership in the Association is one dollar a year, including all bulletins and other publications.

Audubon Nature Camp

In order to add to the number of Nature study enthusiasts armed with definite project programs for the ensuing year, the National Association of Audubon Societies will conduct the Audubon Nature Camp in Maine this summer. While the camp will be designed primarily for teachers, other campers will be welcomed. Full details with respect to the camp, tuition and dates may be obtained from the National Association of Audubon Societies, 1775 Broadway, New York City.

Civic Progress

As usual the *American Planning and Civic Annual* is a valuable and interesting compendium of information on national, state and community progress in the fields of national parks and forests, state parks, roadside improvement, state and city planning and related activities. It is of special value in that it gives a collective picture of the varied activities of government in these directions. Articles are written by men and women in positions of leadership in their special lines of endeavor. This annual is brought out by the American Planning and Civic Association, Union Trust Building, Washington, D. C.

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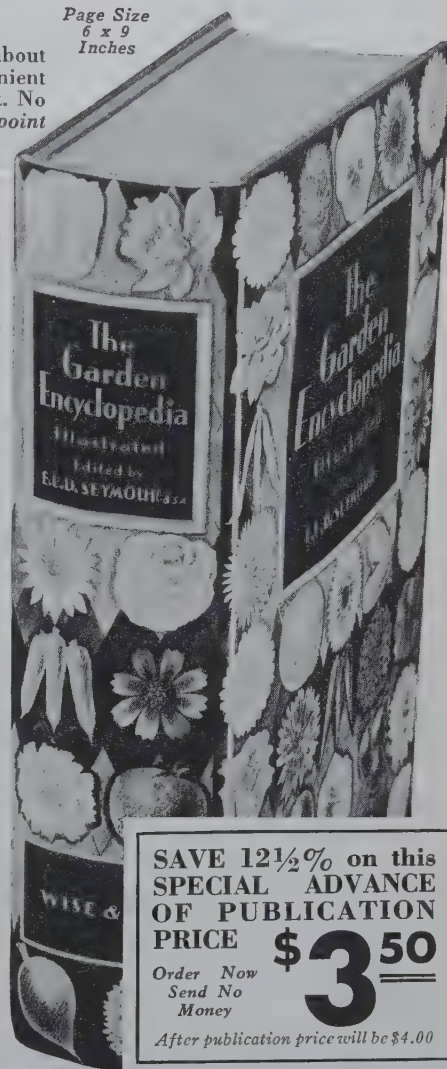
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BY SAMUEL BROWN

Seascapes

Seascapes present, at this time of year, their most interesting phases. Unusual pictures of the seashore, rugged coasts and cliffs, rough seas breaking on rocky shores, ships and yachts are possible subjects. Most fascinating, however, is the play of sunlight on rough seas, or sunrise and sunset across rippled waters.

A seascape picture, to be interesting, should have light, atmosphere and life. Another essential point to be observed is not to take pictures when the sea appears calm because it will seem unnatural. Lighting is important. If the sun is directly behind the camera it makes the waves look transparent. Proper modeling of light is best accomplished when the sun is shining from one side of the camera, or even directly toward it, providing it does not shine on the lens.

Before making the exposure, visualize what is wanted in the picture, and when waves and sea have assumed the proper aspect the exposure must be made instantly. The various elements should harmonize to produce the desired effect.

Cloud formations, if they are present, make the picture more interesting and may be used to aid the composition. When photographing into the sun it is interesting to wait till a cloud passes before it. Beams of light form a pattern on the water and the dust particles in the air reflect each ray of light, giving a beautiful effect.

Boats may occupy a small space, often adding to the interest of the picture and giving a sense of proportion.

Where reflections are included care must be taken that there should not be an equality of interest between the object and its reflection. One or the other should be more prominent, depending on which is the most important. Preferably the reflection should be rendered less light in tone than the object.

Unless there is something of special interest, such as a peculiar wave or sunlight effect, large expanses of water are generally poor subjects.

A good orthochromatic or panchromatic film should be used to take seascapes. A light yellow filter helps to eliminate much of the objectionable blue light so prevalent at the seashore. Due to the tremendous amount of light reflected, exposures should be about one-sixth as long as would be given a normal landscape under the same light conditions. When using a single-lens folding or box camera a small or medium stop should be used. With anastigmat lenses F 16 is recommended. Over-exposure should be guarded against, particularly when it is desired to render modeling of sunlight against a background of sky.

Best results are obtained when the exposures are made at $\frac{1}{25}$ of a second. Slightly longer or shorter time is permissible but only under unusual conditions. In photographing from boats shorter exposures are



SURF ON THE ROCKS. INTERESTING SEA SCENE TAKEN AT $\frac{1}{25}$ SECOND AT F 11

necessary because of the continual motion. Under these circumstances $\frac{1}{100}$ of a second will be required for sharp results. Never rest the camera on the structure of the boat as there is always vibration.

Rough seas from the shore are successful when the coast is rocky and rugged, the tide nearly full and the wind blowing off-shore after a storm at sea. A low viewpoint should be chosen and one should wait for a large wave to hurl itself on shore, throwing a whirling mass of white foam and spray in all directions. Anticipate the critical moment and make the exposure. It is often found that the delay of a fraction of a second in releasing the shutter has meant the loss of a good picture. Do not use too short a shutter speed, otherwise the water will appear frozen.

The camera used at the seashore should always be in a case, preferably waterproof, as there is always a certain amount of spray and moisture in the air. The case will also prevent fine sand from reaching any vital

part. When working in spray the lens should be kept carefully covered till the last moment. Moisture on the lens will cause a fogged result.

Distances at sea are deceptive. Do not try to photograph distant objects as they may be too small to be recognizable. This is especially true when using a camera equipped with a short focal length lens. Get close to the subject, and if the horizon is included see that it is photographed anything but horizontal.

Never wait to photograph a seascape when a scorching sun shines from a glaring blue sky. Venture out when storm clouds are in evidence. There is no more appropriate time than just before a storm when the elements are massed or after the storm as the sun breaks through the clouds—these are the times for seascape picture making.

* * *

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* * *

Finders

The finder on a camera plays the important part of showing just what will be included in the pictures. On the most inexpensive box cameras this is usually a mirror camera-obscura consisting of a lens, a mirror and a ground glass. The light enters the lens and is reflected by the mirror to the ground glass, projecting a small image of approximately what will appear in the picture. The main disadvantage of this type of finder is the dullness of the image seen.

Better box and folding cameras have brilliant finders. These are practically the same as the above, but instead of the ground glass they have a convergent lens. Although the image is much brighter, there is a variation from the field of view that will appear in the picture unless the image is viewed from directly above. The subject seen through one of these finders is sometimes too small to be of much value in posing and lighting, but detachable magnifiers are available.

One type of finder which has recently



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come into popular use is the *direct vision finder*. There are several different kinds of direct vision finders but all of them work on the same principle. Essentially this consists of a wire frame, the size of the picture, mounted on the side of the lens. This frame is hinged and is opened for use. On the back of the camera is a metal plate with a small square hole punched in the middle. This latter is, in some cases, replaced by a sighting rod. When in use, the camera, with the back plate or sighting rod, is held close to the eye and whatever is seen through this in the front wire frame will be included in the picture. This finder is particularly useful when the subject is moving and must be kept in range. Many better type cameras are fitted with both brilliant and direct vision finders.

* * *

Trade Hints and New Books

Economy in Photography, illustrated in color and black and white, is available without charge from this department. Outlining simple procedures from exposure of the film through development, printing, toning, etc. and subsequent treatment of negatives, it makes an excellent little reference. Please send a stamped, self-addressed envelope with each request.

* * *

The Eastman Kodak Co., Rochester, N. Y., announces a new 16 MM motion picture camera called *Magazine Ciné-Kodak*. This camera, in addition to many new features, uses magazines that can be loaded in three seconds. Standardly equipped with the high speed F. 1.9 lens, there is available also a full line of supplementary lenses, including several telephotos. Further information from the manufacturers.

* * *

A developing tank made of monel metal and adjustable to the three popular sizes (127, 120 and 116) has recently been put on the market by the Central Camera Co., 230 S. Wabash Ave., Chicago, Ill. This tank gives excellent results and is simple to operate. When writing to this company, ask for "Central's Photographic Almanac for 1936" which is a 130-page book listing a full line of photographic equipment, and their new 16-page "Inventory Clearance Sale Book." Mention *Nature Magazine*, please.

* * *

An interesting announcement from the Bausch & Lomb Optical Co., Rochester, N. Y., tells of a miniature glass plant, complete in every detail, that will tour many of the larger cities in the United States and will be shown at scientific gatherings, industrial conventions and museums. If interested, write to Bausch & Lomb for itinerary.

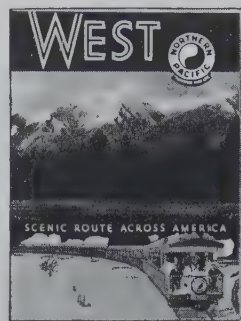
* * *

Telephotography by H. A. Carter, F. R. P. S., is a decidedly informative text of special interest to the Nature photographer who uses telephoto lenses. Telephotography, while of a similar nature as ordinary picture taking, requires some particular manipulations. This book covers thoroughly both

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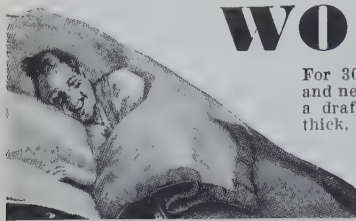
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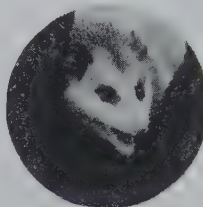
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Movie Making Made Easy by William J. Shannon, now in its second edition, carries out its original purpose in being entirely practical. Much superfluous material has been deleted from the first edition and its place has been taken by some new developments in color photography, namely the Kodachrome and Dufaycolor processes. Moorfield & Shannon, publishers, Nutley, N. J. Price 50 cents.

* * *

The photographic department of Nature Magazine is designed for readers interested in photography and maintains a service that renders assistance with any photographic matter. You are invited to take advantage of this service. Address all photographic inquiries to Samuel Brown, Nature Magazine, 1214 Sixteenth St., N. W., Washington, D. C.

Cordially,
SAMUEL BROWN



Bird "Lollipops"

"Even the birds must have their lollipops these days," writes Marcia M. Eagen of Evanston, Illinois. To prove her point she encloses a picture of an oriole about to consume a candied cherry provided after fresh cherries were no longer on the market. Mrs. Eagen reports that the birds seem to like the bottled variety fully as well as the others and even lick the stick when a new one is not provided.

National Tree

Following its selection in the national popular vote taken by the National Life Conservation Society, the *Sequoia gigantea* is designated as the National Tree in H. R. 10106 filed in Congress by Representative Henry Stubbs of California. It behooves all friends and supporters of this tree to get behind the enactment of this measure.

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In the Month of March

CHARLES C. ABBOTT called March "that month of broken promises", and Wilson Flagg described it as "persistent only in its variableness". Memories of March include the recollection of snowstorms covering the earth in the best of winter fashions, of stormy winds "like a lion", and of new life lost in the relapses of winter. Yet it is at least certain that the month brings the equinox—spring by the calendar. In the return toward the sun that begins almost unnoticed with the winter solstice, and continues barely perceptible throughout January and February, the earth has in March gone so far that daylight equals darkness. Lengthening hours of sunlight and the assurance of the calendar are by themselves enough to arouse the mind and inspire faith. The return of life is inevitable. There was a time when March was the first month of the year, and the arrangement seems peculiarly appropriate to one interested in the seasons in the out-of-doors.

Despite skepticism and defense against disillusionment, one is more likely than not to find in March evidences of spring to delight the senses as well as to corroborate the calendar in one's mind. Pussy willows by a stream bank have a most persuasive though gentle way of telling about spring, and the pendulous catkins of alders charm both sight and touch with their prediction of leaves to come. Near the ends of the also leafless branches of the red maple, scarlet clusters of flowers bear further witness, as do likewise the green-yellow blossoms of the silver maple. And there are woods flowers on the earth's face itself. Hepatica or liverleaf blossoms, perhaps in large clusters, show a shy shade of lavender or a lighter color, even white; and graciously the white or pinkish flowers of the rue anemone wave some sort of greeting on their slender stems. Hispid buttercups in dry places of forests or thickets add a rich yellow to the colors of March flowers. Along streams the pink-veined blossoms of spring beauties tell plainly of the season to all who know the flower's name. The delicacy of the fragrance of these early flowers of the spring adds a distinct pleasure to a ramble in a pleasant March. It is a fragrance that blends well with the odor of damp and warming earth and makes one almost believe he can smell the spring, as well as see and touch it.

Certainly, there is no doubt that one can hear the spring in March, for he can not escape listening to the chorus of the spring peeper—that inch-long tree frog with the two-syllable peep that often sounds like some sweet note of a bird. Thin but clear, the "pe-eps" can be heard far away as the chorus reiterates its message of the season. Incessant it seems until one approaches the swampy place or shallow pond where the peepers are. Then suddenly all is silent, but—irrepressible—the sound soon comes again, singly, venturesome at first, but before long in full chorus all about, generous to the ear but tantalizing to the eye, though sometimes if a person can hold his position (perhaps on one leg on a stone a long step from dry land) for five or ten minutes, he can actually see a

peeper for a few seconds as it disappears from before his eyes, for usually it makes an appearance only while disappearing. With rare good fortune, however, one may even see the frog blow the bellows that lends power to its tiny pipe.

More easily seen are the leopard frogs that musically grunt to one another across the surface of the pond. From the bottom of the pond or of some stream these frogs have recently come from hibernation—among the first of the awakeners—and March will see their egg masses laid in shallow water. Spotted salamanders, recently out of winter quarters, also are laying egg masses in swamps and ponds, and snakes and turtles once more are coming to active life.

Mammals, too, are through with hibernation for another year, and all are again providing for the new lives in their species. The woodchuck has explored anew its neighborhood and cleared out the burrow. The black bears are showing the world to those cubs that began life in winter quarters. The cottontail, which has lived through winter without benefit of hibernation, responds to the freedom of spring as a "madde Marche hare" should, and already before the month has gone it may have its first litter in some fur-lined nest.

The soft ground of spring makes possible again the presence of the woodcock (living on earthworms gotten by probing), and this unique and precious member of our native fauna is again singing to his mate. Hidden on the edge of the swamp or some clear place in a damp woods, the female listens to the rare song of the male as he flies in high spirals, descends trilling, and struts before her voicing a most burry rasping note. Already before the end of March the pair may have a nest of a few dry leaves on the ground in the woods. Other birds, too, celebrate the spring. Killdeer in some fresh grassy field, meadowlarks, and field sparrows are in the open, glad for spring. Mourning doves are again in pairs, once more apparently inseparable. The waterfowl are northward bound. The kingfisher's rattle is again along the streams. And hawks and buzzards are soaring in the winds that give a distinction to March, soaring with as much pleasure for the watcher as might be afforded by a kite once more tugging on hands that have grown too large and sadly too important for kite flying.

Spring has most assuredly come, as certainly as the sap that rises in the maple, though the sugar be made in a grove carpeted with a foot of snow. Spring will express herself more completely another time, but there is no doubting her presence in March. One can sing of spring this month the words that Canada's Pauline Johnson, known best by her Indian name Tekahionwake, once wrote of Lent:

"So hand in hand with fitful March she lingers
To beg the crowning grace
Of lifting with her pure and hoily fingers
The veil from April's face."

—By HOWARD ZAHNISER



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